Impact of Medicare Prospective Payment on the Quality of Medical Care

A Research Agenda

Kathleen N. Lohr, Robert H. Brook,
George A. Goldberg, Mark R. Chassin,
Thomas K. Glennan

Rand

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PREFACE

In the spring of 1984, The Rand Corporation became a health policy and research center for the Office of Research and Demonstrations, Health Care Financing Administration (ORD/HCFA). One of the first tasks undertaken in the center was the preparation of a document that would (a) identify major issues relating to the impact of Medicare's prospective payment system (PPS) on the quality of medical care received by the program's elderly beneficiaries, (b) sketch conceptual and practical aspects of assessing the effect of PPS on quality of care, and (c) outline a research agenda for the Office of Research (OR) in ORD, which is the federal agency charged with monitoring PPS effects on costs, access, and quality of care. The first agenda was circulated to the OR Technical Advisory Panel and discussed at a September 1984 meeting. A revised version was discussed at a special health services research session held during the annual meeting of the American Public Health Association meeting in Anaheim, California (November 1984) and at a session of the Subcommittee on Diagnostic and Therapeutic Practices of the Prospective Payment Assessment Commission (ProPAC) in December.

The present report reflects comments and suggestions from a wide variety of individuals in the medical, health policy, and health services research communities. It is intended mainly as a background document on the issue of the effects of PPS on quality of care. It also briefly describes two studies on this topic currently under way at Rand.

SUMMARY

P.L. 98–21, the Social Security Amendments of 1983, introduced the prospective payment system (PPS) for reimbursement of hospital care provided to Medicare beneficiaries. Henceforth, hospitals are to be paid for each Medicare admission on the basis of a price per case set in advance, and PPS prices (quoted as weights relative to a hypothetical average weight of 1) are established for 468 different Diagnosis-Related Groups (DRGs). PPS departs radically from traditional retrospective reimbursement of costs; it presents hospitals and other providers with incentives for delivering care that are wholly different from those of cost-reimbursement financing.

PPS may foster, for instance, a shift from inpatient to outpatient care for patients whose disorders can safely be treated on an ambulatory basis, and it may promote earlier discharge from the hospital. It may also, however, foster underprovision of certain types of services or premature discharges, perhaps followed by readmissions; it may also encourage unnecessary admissions of less severely ill patients from whom hospitals can expect to profit. In short, PPS may have both good and bad influences in the quality of care received by the elderly.

Quality of care is examined in this report largely in terms of health status outcomes for Medicare patients. At least two reasons argue for attention to the issue. First, when PPS begins to take full effect, quality of care may start to deteriorate, but there is a point beyond which society will not want quality to erode further. Thus, it is critical to have a full picture of PPS impacts on patients outcomes. Second, PPS may improve quality of care, and these changes are important to document and understand in their own right.

The changes in medical care practice hypothesized as potential reactions to PPS are numerous and cover virtually every dimension of health care. The more important effects of PPS, or those more directly related to patient outcomes, involve the following: hospital use generally, use of other facilities and institutions (including care in ambulatory settings), use of health care personnel, severity of illness of hospitalized patients, and mix of cases in hospitals. PPS also has implications for: technology acquisition and hospital management policies; hospital-physician relationships; production and training of physicians and mid-level professionals such as nurses; medical recordkeeping; shifting of costs and revenues across patient populations, classes of hospitals, or geographic regions of the country; and peer and utilization review.

The Office of Research, Office of Research and Demonstrations, Health Care Financing Administration, has responsibility for examining the many possible effects that PPS may have on health care for the elderly; specifically, the office must produce a series of "PPS impact reports" that culminate in FY87. Because of the many and conflicting consequences that PPS may have for quality of care, developing a strategy for investigating PPS impacts in this area is of particular concern to HCFA. This report thus identifies major issues relating to this topic, sketches conceptual and practical aspects of carrying out appropriate studies of these issues, and outlines a quality-of-care research agenda. In formulating the research agenda, we have emphasized changes in hospital care that we believe are most likely to occur secondary to PPS, those likely to have the most direct impact on patients' outcomes, and changes that can be defined, detected, and measured with comparative ease.

We have adopted a traditional conceptualization of quality of care that distinguishes among structure, process, and outcome. Structure refers basically to characteristics of providers; process to the medical, nursing, and other services provided to or on behalf of the patient; and outcome to the end results of care as reflected in the patient's eventual health status. The clinical linkages between processes and outcomes of care are not well established, however, meaning that PPS evaluations cannot rely entirely on measuring either processes or outcomes alone. Administrative data such as Medicare billing information can be used for some quality-of-care assessments, but such data yield little detailed clinical information about either processes or outcomes of care. Thus, some direct evaluations of processes and/or outcomes will probably be needed as well.

Criteria that might guide a program of research in this area include the following: (1) likely utility, persuasiveness, and validity of research projects for policymakers, the medical community, and the public at large; (2) ease and cost of acquiring comprehensive and medically valid data; (3) probability of obtaining useful findings within HCFA's time frame; (4) selecting areas of expected problems and being able to target research there; and (5) costs of otherwise equivalently appealing allocations of research resources. Using these criteria, we outlined a quality-of-care agenda that involved the following elements.

Current research projects include one study to develop reliable and clinically valid outcome measures based on administrative data—so-called "nonintrusive outcome measures" that can be devised from Medicare claims data. Several such measures will be validated against actual medical record data to determine whether clinically plausible linkages between process and outcome can be demonstrated. Planning

is also under way for a possible large-scale direct evaluation of PPS effects on quality of care. Such a study would involve an audit of the medical records of Medicare patients admitted before and after PPS for a spectrum of disorders involving several major medical and surgical specialties; patient characteristics and severity of illness would be controlled for as well.

Other research topics of immediate concern were also identified. These include evaluating quality of care provided in long-term-care facilities (e.g., skilled nursing homes) and by personnel from home health agencies for patients who are discharged from PPS hospitals to such facilities or agencies and, more generally, assessing the outcomes of inpatient care even after discharge from the hospital. Also important is examining the quality of outpatient care both for patients before admission and for those who are now treated exclusively on an ambulatory basis. Substituting care outside the hospital for that inside it has important implications for quality of care, especially for patients who can be presumed to have been kept out of the hospital altogether. Finally, we noted that patients' satisfaction with care may be a necessary (although not a sufficient) outcome variable to study.

Three topics of future interest were noted. First is the continuing need to improve methods of assessing quality of care, especially for the elderly and especially in settings other than acute hospitals. Second is the application of theory and extant methods to assessing impacts of likely extensions of DRG-based reimbursement (e.g., to skilled nursing homes or inpatient physician services). Third, because PPS may not solve the problems it was expected to solve, we recommended some effort be made to look ahead and contemplate the research needs of a rather different Medicare financing environment.

Certain themes for this research effort should be stressed. First, the overall research agenda must be strong enough to detect clinically meaningful impacts on patient outcomes and strong enough for reasonable people to assign those impacts to PPS. Better models that relate structure and process to outcomes for diagnoses of interest will be needed. The "reasonable person" test might then be said to be met if process measures and patient outcomes change in the ways predicted by such models.

Second, outcomes other than death must be examined. Even when mortality rates are the only readily available measure of impact, deaths occurring in hospital *and* within different periods post-discharge should be considered. Eventually, functional status after hospitalization, length of time to full recovery, mental and emotional health, and other facets of quality of life for the elderly must be addressed if we are to say that quality of care has been fully evaluated.

Third, the effects of PPS, if translated into reduced inputs such as shorter lengths of stay or fewer ancillary services provided, will influence patient outcomes differently, depending on the nature of the services changed and, more importantly, the types of patients affected. Hence, interpreting the impacts of PPS requires understanding the clinical circumstances of Medicare patients. This in turn requires active participation of hospital, medical, and nursing communities in quality-related research.

Fourth, being able to monitor changes in quality through secondary data is an important capability, so developing better outcome measures is essential. However, adequate comprehension of PPS effects, especially in the early years, requires information from medical records, if the evaluations are to be believed by the medical community and the Medicare population. Research involving direct patient and provider contact is desirable.

Fifth, targeting impact studies on high-priority topics (e.g., types of patients, crucial or common diagnoses and conditions, certain procedures, and classes of hospitals) will be unavoidable. Criteria by which topics are selected will be needed very quickly. Focusing on diagnoses or DRGs where adverse effects on quality seem likely is perhaps the best initial approach, because it is tied to expected (or observed) changes in medical care delivery brought about by PPS and because it is linked most directly to clinical issues of concern to physicians. Taking account of the full range of patient complexity is crucial for any before/after comparison study.

Sixth, policymakers, Medicare beneficiaries, and the medical and hospital communities should all recognize that developments (good or bad) in the first year or two of PPS may not accurately reflect conditions when prospective payment reaches a steady state. A full picture of the effects of PPS requires a long-term perspective, one that extends beyond FY87.

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Barbara Eubank typed and processed this manuscript with her usual skill and care.

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I. BACKGROUND AND OVERVIEW

INTRODUCTION

Advent of Prospective Payment in Medicare

P.L. 98–21, the Social Security Amendments of 1983, introduced the prospective payment system (PPS) for reimbursement of hospital care provided to Medicare beneficiaries.[1] Henceforth, hospitals will be paid for each Medicare admission on the basis of a price per case that is set in advance. These PPS prices are based on the "average resource use" for patients who are classified into one of 468 DRGs.[2] Thus, hospitals must try to keep their expenses at or below pre-established prices, rather than rely on retrospective reimbursement of costs.

The PPS system went into effect on October 1, 1983, for those hospitals whose accounting year began on that date; other PPS hospitals were phased in during the remainder of FY84 as they reached their accounting anniversary dates. About 20 percent of hospital stays were affected as of the start date, another 25 percent on January 1, 1984, and an additional 50 percent by July 1, 1984; the remainder came under PPS at other times throughout the year.

The main elements of PPS involve a three-year transition into a *national* set of DRG-based prices for hospital care; these will be adjusted only for the hospital area's wage rate and its rural or urban location. By the beginning of FY87, the Medicare payments are supposed to be 100 percent of the national urban or rural DRG rate, barring legislative changes during the phase-in period.

The pricing system applies to virtually all inpatient admissions of Medicare beneficiaries. Exceptions are allowed for a small fraction of patients who end up with unusually long lengths of stay or unusually high costs (day or cost "outliers"). Exempted from the system are certain types of hospitals (at least initially), all hospitals in some states

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[1]A more detailed overview and set of references can be found in Lohr and Marquis (1984). A clear description of the derivation of Diagnosis-Related Groups (DRGs) now in use is given by Grimaldi and Micheletti (1983). A recent report of the Prospective Payment Assessment Commission (ProPAC, 1985) describes the workings of the PPS with useful detail and examples. For the reader interested in recent articles on these topics, a selected bibliography is presented following the references.

[2]DRG prices are actually "weights" specified relative to an hypothetical "average" DRG weight of 1; the weights reflect the intensity of resources used ("average resource use") in treating patients so classified.

with their own cost-control systems ("waiver states"), and certain special units within PPS hospitals.

PPS departs radically from the traditional retrospective payment mechanisms. It presents hospitals and other providers with incentives for delivering care that are wholly different from those inherent in cost-reimbursement financing. Now hospitals must be much more attentive to their own costs of treating patients. They have financial incentives to admit patients whose costs are likely to be low (relative to the expected DRG payment) and to refuse or delay admission (or curtail treatment) to patients whose costs are likely to be high.

Thus, PPS may foster underprovision of certain types of services or premature discharges (perhaps followed by readmissions), or it may encourage unnecessary admissions of patients from which hospitals can expect to profit. In general, although PPS may (or may not) have marked effects on the costs of care or on who pays for care, it may also have impacts on the quality of care. Such impacts can be good as well as harmful.

The PRO Program

The Utilization and Quality Control Peer Review Organization (PRO) program is an integral part of the PPS approach.[3] Hospitals paid under PPS had to have a signed contract with their state's PRO by November 15, 1984, as a condition of further payment. PROs have two-year contractual arrangements with DHHS. In the first contract period, all but one PRO are so-called physician-sponsored or physician-access "nonpayer" organizations; one is a fiscal intermediary. The program is managed by the Health Standards and Quality Bureau (HSQB), and a good deal of information pertinent to quality of care is routinely reported (e.g., quarterly) by the PROs to HSQB.

PROs have numerous mandated tasks. Major concerns for PROs include reducing inappropriate admissions and strenuously monitoring hospital-specific admission patterns, reviewing day and cost outlier cases, and validating diagnostic and procedure information. Much of this review must be based on medical records.

Because PPS gives hospitals a clear incentive to curb services, especially length of stay and perhaps some ancillary services, every PRO must pursue five specific quality objectives, which are specified as numerical goals to be achieved at least by the end of the two-year contract period. These are: (a) reduce unnecessary hospital readmissions

[3]For more information about peer review efforts in the public sector and the PRO program in particular, see Lohr and Brook (1984), or Lohr (1985).

resulting from substandard care provided during the prior admission; (b) assure provision of medical services that, if not performed, have a "significant potential" for causing "serious patient complications"; (c) decrease avoidable deaths;[4] (d) lower unnecessary surgery or other invasive procedures; and (e) reduce avoidable postoperative or other complications.

PPS Impact Reports

Congress required annual reports on the impact of PPS for the 1984, 1985, 1986, and 1987 fiscal years. These are to cover a myriad of topics, including quality of care. The Office of Research in the Office of Research and Demonstrations of the Health Care Financing Administration (OR/ORD/HCFA) has responsibility for the preparation of these impact reports. The FY84 report will briefly describe OR's plans for monitoring and studying the impact of PPS on quality of care. The FY87 report is considered the most important in the series; it will encompass information about effects that may not be immediately felt and will present results of long-run, more intensive investigations.

IMPORTANCE AND VALIDITY OF THE QUALITY-OF-CARE CONCERNS

Quality of care, which we examine in this report largely in terms of health status outcomes, is a significant concern for at least two reasons. First, when PPS begins to take full effect on Medicare inpatient expenditures, quality of care may start to deteriorate, but there is a point beyond which society will not want quality to erode further. Thus, it is critical to have a full picture of PPS impacts on patient outcomes. This picture should extend beyond acute hospital care to long-term care and ambulatory care outcomes, and beyond reliance on secondary data to collection of primary health status data.

Second, PPS may improve quality of care. Production efficiency may be enhanced through more skillful management; clinical efficiency may also respond positively.[5] These changes are important to document and understand.

A full accounting of the impact of PPS must eventually describe and evaluate the likely tradeoffs between these negative and positive effects

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[4]This quality objective has recently been modified to "reduce the risk of mortality."

[5]For a full discussion of the pertinence of clinical and production efficiency to quality of medical care, see Donabedian et al. (1982).

on patients' outcomes of care and between net effects on quality of care on the one hand and program expenditures on the other. Further, conclusions and interpretations of PPS studies must be perceived as valid and fair. Thus, the internal reliability and face validity of all quality-of-care research must be high.

OBJECTIVES OF THIS REPORT

This report has two objectives: to sketch theoretical or conceptual aspects of assessing the impact of PPS on quality of care over the next few years and to outline a research agenda around which OR/ORD/HCFA might structure part of its program in this area. In commissioning this work, HCFA asked particular questions: (a) What major topics should be considered in assessing the effect of PPS on quality impacts? (b) How might existing activities within ORD/HCFA be used or expanded to illuminate quality issues? (c) Are there ways in which activities of the HSQB of HCFA might be helpful? (d) How can extramural research best be targeted to augment in-house efforts? (e) How might other outside sources be used to augment the information that will be needed for the annual impact reports?

Although PPS was not implemented as a randomized controlled trial, outlining a research design strategy in those terms may be helpful in addressing the above questions. The next section briefly describes the PPS intervention, specifies effects it is expected to have on the medical care delivery system, and discusses important dimensions of doing related research on quality of care.[6]

Section III discusses in more detail quality-of-care topics likely to be important in PPS evaluations. Both positive and negative consequences of PPS are noted, and suggestions are made as to disorders or DRGs that might be given high priority for study. Finally, the last section outlines a proposed research agenda for the immediate period and for the longer run. Among the key dimensions to this agenda are data sources (administrative data, medical record information), the need to demonstrate medically plausible relationships between processes of care and patient outcomes, the importance of evaluating quality of care

[6]The past decade has seen several efforts to contain costs through prospective reimbursement schemes. These state-based prospective payment programs differed from each other and from the Medicare PPS; they give indirect clues as to PPS impact on quality (Gaumer and Cromwell, 1983). The quality-of-care field itself has experienced tremendous growth in this period as well. Moreover, there is no lack of hypotheses about what effects curtailing use of service might have on quality of care and patient outcomes. However, a thorough review of the PPS or quality literatures was well beyond our present task and resources.

directly in making pre-PPS and post-PPS comparisons, and the desirability of looking beyond inpatient hospital care to care obtained in nursing homes and in ambulatory settings.

II. EFFECTS OF PPS ON THE MEDICAL CARE SYSTEM AND QUALITY OF CARE

INTRODUCTION

Space does not permit a full discussion of all the potential impacts of PPS on quality of medical care rendered to Medicare beneficiaries.[1] Tables 1–3 provide a quick reference or summary of the main effects of PPS that are occurring or that many observers expect to see. Table 1 outlines to whom the PPS program applies; Table 2 describes possible effects on the medical care system. In Table 3, which outlines the

Table 1

PRESENT AND CONTEMPLATED IMPLEMENTATION OF THE PROSPECTIVE PAYMENT SYSTEM

DRG-Based PPS Presently Applies to:
Medicare patients: Acute, short-term general hospitals in all jurisdictions except:
— "waiver states" of New Jersey, New York, Maryland, Massachusetts
— "exempted areas" of Virgin Islands, Puerto Rico, Guam, American Samoa
— "exempted hospitals": psychiatric, rehabilitation, alcohol and drug dependency, long-term care, and children's hospitals in PPS states
— "exempted units" in PPS hospitals: psychiatric units, rehabilitation units, long-term-care units, alcohol and drug dependency units
All patients: Acute, short-term general hospitals in "all-payer" states
DRG-Based PPS May Be Extended to:
Specific types of hospitals
— psychiatric hospitals
— children's hospitals
— rehabilitation hospitals
Long-term-care facilities (e.g., skilled nursing homes)
Hospitals in specific locations (Puerto Rico, Trust Territories)
Physician services to inpatients
Home health care agencies
Other third party payers in states that are not "all-payer" now

[1]See the bibliography for articles discussing some of these points in greater detail.

effects on patient outcomes, we have adopted the traditional structure, process, and outcome triad (Donabedian, 1966) as a way of cataloguing quality-of-care variables. Finally, Fig. 1 depicts a condensed "flow chart" of the structure, process, and outcome relationships based on these tables.

Later sections of this report present tables that specify some quality-related topics that we believe warrant early consideration in formulating this research agenda. In some cases, we distinguish between patients who are appropriately admitted and those who, before PPS, may have been inappropriately (unnecessarily) admitted. In choosing these system changes and quality effects, we have emphasized (a) those that we think are most likely to occur (e.g., shorter lengths of stay), (b) those likely to have the most direct impact on patients, and (c) those that can be defined, measured, or detected with comparative ease.

EFFECTS OF PPS ON THE MEDICAL CARE DELIVERY SYSTEM

Changes attributable to (or at least contemporaneous with) PPS have been hypothesized for most aspects of health care (Table 2). To comprehend the impact of PPS on quality of care in the short run, the effects on hospital use, case mix, severity of illness, use of other facilities and institutions, and use of health care personnel must be understood. Technology acquisition and hospital management policies may affect quality in ways that are more discernible in the longer run. Other areas may experience important changes with PPS (e.g., more complete and accurate recording of diagnostic and other information, or better data management techniques), but the ramifications for the quality of patient care (especially patient outcomes) may be only indirect.

Regarding the characteristics of hospitalizations, the first prominent change will be shorter lengths of stay. Anecdotal evidence (e.g., patients who are receiving home health care services or being discharged into nursing homes are sicker, on average, than previously) suggests that earlier discharges are already occurring and triggering significant differences in discharge destinations. These changes cannot be attributed entirely to PPS, however, because lengths of stay have been falling for the last 15 years or so.

PPS provides strong incentives to increase certain types of admissions. These include admissions for patients expected to be at or below DRG costs, those in which diagnosis and treatment (e.g., surgery) can

Table 2

POSSIBLE OR ANTICIPATED EFFECTS OF PPS ON THE MEDICAL CARE DELIVERY SYSTEM

Characteristics of Hospital Use:
Shorter lengths of stay for people appropriately admitted
More admissions (especially of patients in "high-variation" DRGs)
More readmissions for possibly related problems (more than a week apart because of PRO regulations)
More "readmissions" for medically unrelated problems that previously might have been handled in the first admission—the "no dual workup" issue
More "split" (medical, then surgical) or "sequenced" (diagnosis, then therapy) admissions
More use of ancillary services that shorten length of stay or are cost-saving
For services that are neutral with respect to lengths of stay or add to costs:
Less intense use of diagnostic laboratory, radiology, and pathology services
Less intense use of therapeutic ancillary services (e.g., those that require a person to serve a patient, such as physical therapy and occupational therapy or respiratory therapy)
Less use of blood (or less blood held in reserve, fewer single units used)
Less use of IV fluids per case where used at all; lower proportion of cases using IV fluids
Fewer days of care in coronary care units (CCUs) or intensive care units (ICUs) relative to days on regular wards
More severe case mix of patients in CCUs or ICUs
More "do not resuscitate" orders or "clarifications" of existing resuscitation orders
Increases in transfers of patients between hospitals (so that both hospitals receive some reimbursement: one the DRG, one a prorated per diem payment)
Fewer surgical procedures when costs of doing the surgery are high to the hospital relative to expected DRG payment
More surgical procedures when surgery is profitable for the hospital
Preference for surgical over medical treatment (e.g., insertion of a pacemaker instead of medical treatment of arrhythmia; treatment of back problems or fractures of major joints or femur)
More "paired" or "sequenced" admissions for procedures that could be done during a single admission (e.g., breast biopsy followed by breast surgery; coronary angiography followed by coronary artery bypass graft; two-stage procedures for carcinoma of colon)
Within a surgical DRG, choosing a simple over a complex procedure (such as coronary angioplasty over coronary artery bypass surgery)
Changes in amenities available to inpatients (more or fewer depending upon relationship to costs to hospital and ability to attract desirable patients)

Table 2 (cont.)

Case Mix and Severity of Illness:
Concentration of procedures and/or DRGs in high-volume hospitals (or large, complex hospitals)
Changes in severity of illness mixes in hospitals secondary to transfers and/or admission policies (different in different types of hospitals: e.g., sicker patients sent to large urban community hospitals because they are not admitted elsewhere)
Changes in severity of illness or complexity of problems within DRGs: more heterogeneous DRGs will see a narrowing of range as sicker patients are "bumped" into higher-weighted (but less heterogeneous) DRGs; less heterogeneous DRGs will see a widening of the range as relatively less sick patients enter the DRG
Increases in the percentage of cases in DRGs with comorbidity or complications (CC) relative to the related DRG without CC (e.g., DRGs 16 and 17 for nonspecific cerebrovascular disorders)
Use of Other Providers:
Changes in discharge destinations (e.g., higher proportion to skilled nursing and/or intermediate-care facilities or to similar units within hospital)
More use of home health care
More use of pre-admission outpatient services
More use of "one-day" or "outpatient surgery" units in hospitals
More use of outpatient care generally for certain classes of (expensive) patients
Unbundling of selected inpatient functions to outpatient facilities (e.g., laboratory, radiology)
Health Personnel Use, Production, and Training:
Fewer support staff per patient
Changes in assignments of support staff (e.g., more nurses in the operating room (OR), fewer on wards, if hospital "specializes" in surgical DRGs)
Changes in ratios of LPNs to RNs
Secondary effects on physician specialty choice and geographic (local, regional) distribution
Changes in mix of U.S. and foreign-trained physicians employed on hospital staffs
Hospital Management Techniques:
More planning, marketing, and advertising activities
Greater attention to target "business units" such as specific patient populations (younger age groups among the elderly, selected diagnostic groups)
Opening of profitable (PPS-exempt) units (rehabilitation, alcohol detoxification)
Vertical integration of medical care delivery system: e.g., hospitals acquire skilled nursing home (SNF) beds or facilities
Horizontal integration and mergers of hospitals —economies of scale in management —regionalization of services or procedures within own system —increased buying power

Table 2 (cont.)

Corporate restructuring, e.g., not-for-profit hospitals create a for-profit umbrella or parent organizations that pursue non-medical enterprises for profit
Closure of hospitals, wards, or beds "Mothballing" of beds or wards
New or expanded discharge planning policies
New or expanded utilization review activities Use of written guidelines or criteria lists governing use of laboratory tests or expensive technologies (e.g., CAT scans) Development of computerized patient monitoring software (which can feed back patient information to attending physicians on a real-time basis) More physician involvement in local (hospital) review activities More use of review nurses and coordinators More decentralized (e.g., departmental) decisionmaking
New inventory management policies (e.g., recycling of disposable items, tightening up on stocks)
Hospital-Physician Relationships:
Greater cooperation between administrators and physicians More physicians in administrative roles More power for administrators to remove admitting or operating room privileges or close staffs to new members Changes in payment arrangements (e.g., more or fewer full-time salaried staff) Potential for conflict if administrators dictate patterns of practice formerly thought to be the exclusive reserve of the physician
Technology Acquisition:
Accelerated acquisition of computers in hospitals for billing, medical record keeping, and monitoring of services during patient stay Acquisition of expensive hardware slowed (effect somewhat unpredictable because of differences in hospitals' capital acquisition cycles, whether technology is expected to generate net savings for the hospital, and future policy decisions about capital costs) Adoption of new procedures —cost-saving procedures adopted —cost-raising procedures adopted less quickly (if at all); adoption hindered or facilitated depending on DRG recalibration, reclassification, or reweighting decisions Slowing of new product development

Table 2 (cont.)

Cost-Shifting:
From public to private sector third party payers
From third party payers to patients (e.g., greater use of outpatient care and thus higher Part B coinsurance burden)
Revenue-Shifting:
From high-cost to low-cost hospitals
From high-cost to low-cost regions of the country
Peer Review and Utilization Review:
More emphasis on utilization review activities than before
Changes in physician involvement in formal (PRO) federal review activities
Greater concern than before with underutilization of services
Data Collection and Reporting:
Greatly improved accuracy and completeness in coding of diagnoses and procedures on Medicare claims
Considerable attention to choice and sequencing of diagnoses, use of "rule out" codes where profitable, and other ways to exploit the vagaries of the ICD-9-CM (and hence DRG) system
Changes in Medicare Hospital Stay Record (Part A) data reported
Possible changes in Medicare inpatient physician and outpatient (Part B) data reported
Development of new HCFA data sets, such as the Medicare Automated Data Retrieval Systems (MADRS)
Other External Effects:
Potential impacts on Medicaid program and on Medicare/Medicaid crossovers (dependent on state definitions of beneficiary eligibility and services covered, and on changes in financing of long-term care)
Potential impacts on patients covered by other third party payers (e.g., cost-shifting), which may in turn affect Medicare
Greater marketing to and purchasing of "Medigap" policies by the elderly, which may in turn affect Medicare
Less free service provided to poor, uninsured patients
Less subsidization of new services such as hospice or outpatient services in general

Table 3

DIMENSIONS OF QUALITY OF CARE POTENTIALLY AFFECTED BY PPS IMPLEMENTATION

Patient Outcomes
Deaths in hospitals — medical cases — surgical cases • during surgery • post-surgery — unexpected — expected but earlier in admission
Deaths shortly after discharge
Complications during admissions — morbidity related to anesthesia — morbidity related to surgery — infections (wound, catheter, systemic) — pneumonia acquired in hospital
Need for readmission
Medical status at or shortly after discharge — fever within previous 24 hours — ambulatory status — discharge on specific medications • antibiotics • pain medications
Level of control of chronic disease at or shortly after discharge — physiologic measures of blood pressure, glucose, hemoglobin, pulmonary function, etc.
Functional status at or shortly after discharge — ability to care for self — ability to carry out daily activities or resume previous activities

Table 3 (cont.)

Mental/emotional status at or shortly after discharge — patient's perception of readiness to be discharged — feelings about returning home — feelings about discharge to nursing home — feelings about possible need for more outpatient care than before (with higher Part B cost-sharing) — depression and anxiety
General quality of life after discharge, both short- and long-term
Patient's satisfaction with care
Process-of-Care Measures
These are essentially captured in items listed in Table 2. They include, for example, lengths of stay, use of ancillary services, or use of consultant services.
Structural Variables
These are essentially captured in items listed in Table 2. They include variables such as manpower mix, JCAH accreditation, or hospital management policies. Examples might be fewer RNs per patient-day, greater computerization of recordkeeping, or more utilization review.
Secondary Effects on Quality
Improved ways to measure quality of care or do quality assurance Changes in access to care — less if hospitals close (in inner city or rural areas; in high-cost areas) — potentially less if regionalization or concentration of procedures or DRGs occurs Improvements to nursing home care if more discharges to LTC facilities forces greater attention to problems in those institutions

ethically and medically be split, and those for patients with uncomplicated problems who previously might have been managed as outpatients.[2] We would expect, for instance, to see a drop in workups of problems other than the one causing hospitalization.

Hospitals may lower use of diagnostic and therapeutic ancillary services, both those requiring direct provider/patient interaction (e.g., physical therapy, respiratory therapy) and those that are more anonymous (e.g., laboratory tests). A third important change may be less use of expensive subunits of the hospital: medical ICUs, surgical ICUs (or ICU-type care in the recovery room itself), and CCUs. Related to this might be leaner or more flexible staffing of such units.

Another hypothesized change is reduction in labor-intensive nursing services. This could take one of two main forms (or perhaps both): (a) replacement of RNs with lower-cost personnel or (b) reductions in staff per patient. In addition, less use of specialized therapists (e.g., inhalation therapists) or teams (e.g., IV teams) might occur.

Some observers believe that reducing the number of full-time equivalent employees per patient will be a very important option for curbing costs; what types of employees are cut would undoubtedly vary by type of hospital. This in turn implies new and different management and professional relationships among hospital trustees, administrators, physician and nursing staff, and other professional and paraprofessional groups.

Such changes require hospitals to change traditional patterns of behavior of their physician staffs and other personnel. These are not inconsiderable tasks; they are likely to take several years. Thus, we suggest caution in expecting to detect short-run changes in quality of care produced by PPS; long-run observations will be necessary.

We cannot predict all the changes in medical care delivery that PPS may bring about or their net effects on quality of care. Neither can we elaborate here on the number and precise nature of research efforts that might help describe and clarify these effects. The first steps should be simply to determine *if* these system effects are taking place. Sections III and IV outline a multi-year research agenda for OR/HCFA, including topics that might initially be pursued. We do not wish to imply, however, that these would be the only areas worthy of substantial investigation in the next few years.

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[2]PROs have major responsibility for monitoring changes in admission patterns of this sort. Obvious manipulation of admitting practices will doubtless be detected and appropriate sanctions applied. The real problem may come in cases where the decision to admit is truly a close judgment call on medical grounds. Split admissions (e.g., the first for a trial of medical therapy, the second for surgery as the last resort) do not a priori indicate bad care.

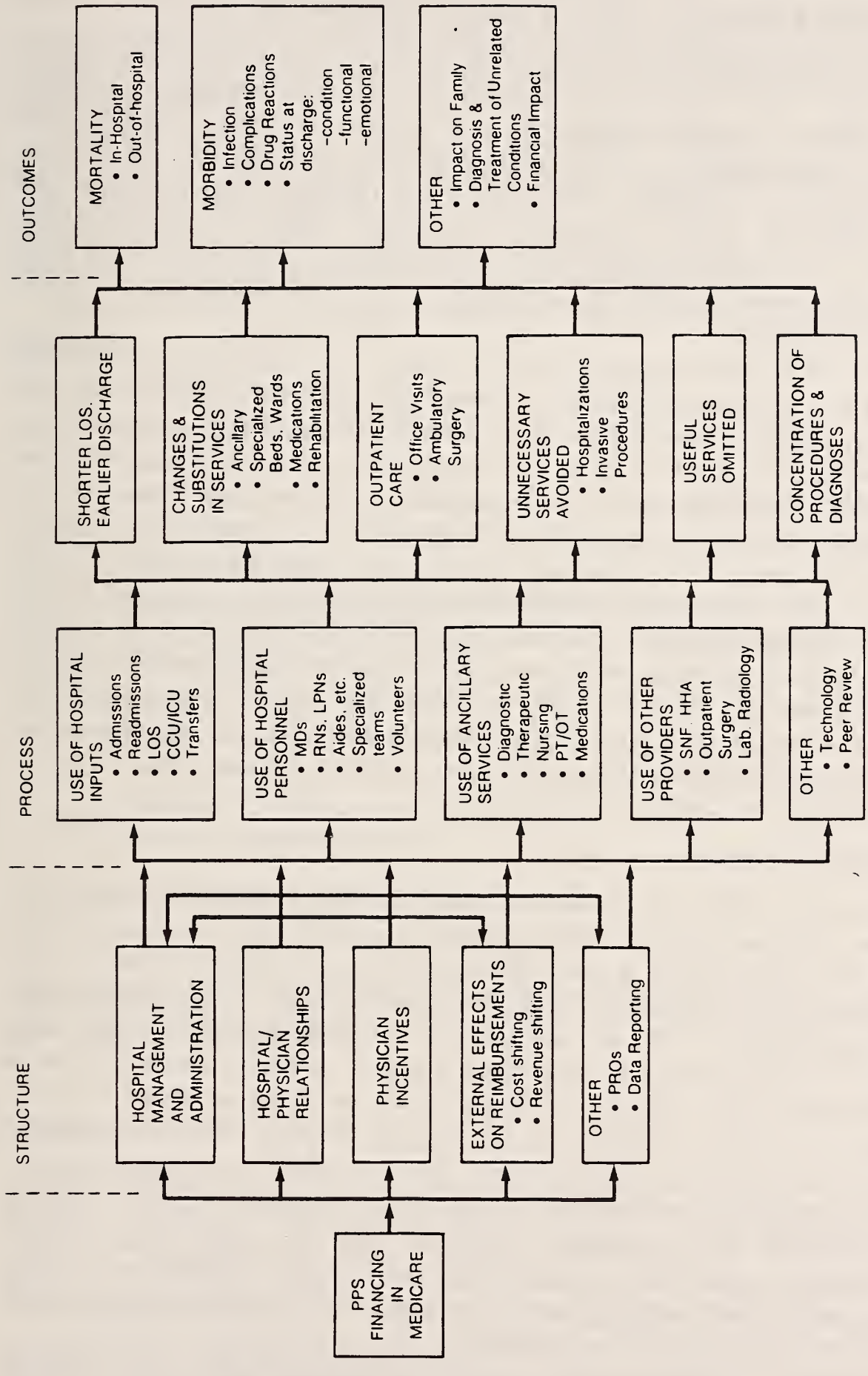

Fig. 1—Relationships among structure, process, and outcome in the PPS environment

EFFECTS OF PPS ON THE QUALITY OF MEDICAL CARE

Choosing a Measure of the Quality of Medical Care

The triad of structure, process, and outcome remains the best starting place for approaching quality-of-care measurement. Patient outcomes—i.e., health status—are the fundamental issue. Because the relationships between outcomes and process of care are not always scientifically established, evaluating PPS impacts ideally should not rely solely on either outcomes or process measures. Relationships between structural variables (e.g., characteristics of providers) and process measures—and hence structure and outcome—are even more poorly described.

Other than the obvious measures, such as in-hospital complications or death, outcomes are hard to assess in detail, over a sufficient period of time, and in a way that corrects for the effects of factors other than immediately antecedent care. For these reasons, and because of considerable documentation in the medical record, process measures are ordinarily the focus of quality-of-care studies. For a similar investment, the tradeoff is between, on the one hand, examining a large number of process measures (or fewer in greater depth) without a clear understanding of their relevance for patient health status and, on the other hand, examining outcomes directly but in less breadth or depth. In the remainder of this report, we emphasize patient outcomes; PPS-related changes in medical care delivery are, nonetheless, important process measures that will need to be tracked and documented.

Patient Outcomes

As noted, PPS may have both good and bad effects on patient outcomes. At the simplest level, benefits will arise from iatrogenic problems that are avoided if fewer patients are hospitalized, if patients are discharged more promptly, and if less use is made of services of dubious contribution to the patient's ultimate well-being. Fewer drug reactions if fewer patients receive drugs such as prophylactic antibiotics is a commonly used example. Disorientation or distress owing to placement in an ICU or CCU may be lessened if patients are returned to regular units more quickly; better mental health may result simply because patients are leaving the hospital environment sooner. The risk of morbidity and iatrogenic problems may be lessened if patients receive fewer operations or incidental but invasive procedures. Finally, improved patient outcomes are expected from concentration of certain procedures in high-volume hospitals.

Positive outcomes can be usefully distinguished from "no negative outcomes." For example, if the rate of iatrogenic episodes or events

(e.g., nosocomial infection rate) stays the same, we cannot call that either a positive or a negative impact of PPS. If the rate drops, we would regard that as a positive impact of PPS, assuming that secular trends have been controlled for and that all, or at least most, other things were equal.

Of great importance socially and medically, however, are harmful consequences to the quality of care and their cost implications immediately and in the long run. A spectrum of possible poor outcomes extends from unexpected, avoidable, or premature death to disability or discomfort that would otherwise not have been experienced.

The dimensions of patient outcomes that ought to be considered include:

a. mortality in hospital or shortly post-discharge;
b. adverse ("sentinel") events and complications during admission;
c. inadequate recovery or complications necessitating readmission, which arise from insufficient or poor care during a previous admission;
d. prolongation of a medical problem because it was not worked up during an admission for an unrelated condition;
e. worse health status for patients whose complex medical problems or other undesirable attributes (e.g., poverty) lead to delay or denial of admissions;
f. worse quality of life, such as poorer functional status post-discharge, delay in resuming daily activities, or poorer emotional or mental health.

We discuss these points further in Sec. III.

VALIDITY AND INTERPRETABILITY OF QUALITY-RELATED RESEARCH

Random Effects

Some impact on quality of care can be expected simply as a nonspecific reaction to the changed hospital administration environment. An increased impetus to profit through cost savings will be present at the start of PPS. Many hospitals, however, will lack appropriate management experience to implement the changes, so the relationships among initial management actions, actual cost savings, and effects on patients may not be the same as the long-range effects.

Probably the earliest management steps will be to familiarize administrators with the data reporting and other requirements of the PPS system. Among the first steps after that may be cutbacks in full-time equivalent personnel other than physicians. Only secondarily will management turn its attention to physician behaviors and practice patterns.

Some early administrative decisions may subsequently be reversed or modified, as providers become more knowledgeable about DRG-based PPS and its ramifications for their own institutions, so the initial steps may have only transient effects on the quality of care. In short, the possibility of these "random" or unpredictable effects must be recognized so that legislators, policymakers, and the medical profession do not act or react precipitously in the face of early hints of change or effect.

Secular Trends

Negative developments or decrements in levels of quality may not be truly attributable to PPS. Special attention to quality may highlight deficiencies in care or poor patient outcomes that were essentially there all along. In short, the impacts of PPS must be carefully disentangled from secular trends in quality of care, just as contemporaneous changes in length of stay, diffusion of new technologies, improvements in data recording, and the like must be accounted for.

Longitudinal studies—"before/after" comparisons and more extensive time series and prospective studies—have particular importance. The initial PPS effects on quality may be small because many useful efficiencies can be put into place; these may even enhance patient outcomes. As the "slack" is taken up, however, PPS effects may begin to pose a threat to patient outcomes. For instance, recalibration of DRG weights may prompt stringent retrenchment by hospitals; "all-payer" systems may reduce opportunities for cost-shifting. In short, continued or accelerated constraints on resources may force economies that are not consistent with maintaining quality.

This problem may arrive sooner for some hospitals or regions of the country than others, although efficient hospitals with costs below the national average may not be as affected as the DRG payment formula shifts toward the wholly national rate. The point, however, is that a long-range assessment, one that may take the full period of PPS phase-in, may be necessary to provide an adequate *initial* view of the impact of PPS on quality.

Distribution Effects

No evaluation of quality of care under PPS can be thought complete if it does not address the issue of whether PPS effects are distributed equitably or fairly across regions of the country, types of hospitals and other institutions, DRGs, or classes of Medicare beneficiaries. Among the critical factors associated with distributional issues are that DRG prices are based on average resource use and that the dispersion around a DRG average can be extreme.

Even inefficient hospitals can make money—and even efficient hospitals can lose—depending on whether patients' needs tend to be mainly at, above, or below the DRG price. Some types of hospitals, or those in some parts of the country, may consistently be better or worse off, with quality affected accordingly. Furthermore, some DRGs are quite heterogenous (e.g., DRG 174, for gastrointestinal bleeding from anywhere in the GI tract). Some patients with very similar problems may be in DRGs with very different weights (e.g., patients with possible angina secondary to atherosclerosis, true angina, or severe chest pain could be placed, respectively, in DRGs 132 or 133, in DRG 140, or DRG 143 depending upon idiosyncrasies of coding or recording level of diagnosis on hospital chart face sheets). Care that is correctly geared to the average patient may be inadequate (or inappropriate) for those with more (or less) serious problems.[3]

Direct Assessment of Patient Care

No evaluation in this area will be complete or perceived as valid if it does not include some direct assessment of inpatient care. People will understandably ask: Do patient outcomes or the processes of medical care in the PPS environment meet professionally developed standards?

Reasonable people can disagree about where such standards should be set. Furthermore, over a decade of quality-of-care research documents that the practice of medicine usually does not live up to the process-of-care standards that physicians set for themselves, but at least such standards have the virtue of reflecting the levels to which the profession (or society) aspires. Our point is that the validity of this research program necessitates direct evaluation of inpatient care in PPS hospitals.

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[3]These points are more fully developed by Iezzoni and Moskowitz (1984) in a study of the clinical impact of DRG-based reimbursement of physicians. Such a payment scheme for physicians shares many of the problems of DRG-based hospital payment.

Studying Outcomes Nonintrusively

Finally, patient outcomes and health status are the end product of interest. Within present budgets, no programmatic or research agency can afford to monitor them directly with patient and provider samples of sufficient size or representativeness to cover all types of hospitals every year. To do so would require a dramatic increase in budgets that in times of constrained resources would probably be difficult if not impossible to obtain.

Administrative data have tended to be unsuitable for studying any patient outcomes except mortality. Absent a budgetary windfall, therefore, HCFA will need to devote some attention to using outcome measures that it already collects, to validating the clinical (medical) linkages among disease severity, process of care, and expected patient outcomes, and to designing appropriate sampling strategies.[4] These areas would warrant attention even if PPS had not been introduced; the rapid implementation of this radical change in reimbursement simply heightens the need.

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[4]Section IV describes one such study currently under way at The Rand Corporation to validate a set of unobtrusive outcome measures against professionally defined process-of-care standards. Professor Avedis Donabedian makes the following argument about research directed to this area: Relying on adverse outcomes, even those measured unobtrusively, to appear in sufficient numbers to trigger alarm and action means that some patients are harmed who might otherwise have been protected. Thus, an argument can be made for the need to develop valid process measures that will set the trigger off sooner, without generating too many false alarms. A set of "critical outcomes" might be developed across the field of important diseases, perhaps in a research project testing a monitoring system with two concurrent carefully matched elements, one of critical process measures and another of critical outcomes.

III. IMPORTANT QUALITY-OF-CARE RESEARCH TOPICS

INTRODUCTION

As we have foreshadowed in earlier sections, HCFA's research agenda can be centered on one or more of these general units of analysis:

- patient outcomes generally,
- process-of-care measures generally, and
- treatment and outcomes in specific diagnostic categories or DRGs.

In fact, a research strategy should probably include some studies related to each of these.

Patient outcomes are the most appropriate measure of quality of care, but they can be expensive and difficult to measure. Absent experimental trials, it is hard to establish causal links between financing systems and outcome measures. Examined by themselves, they provide little guidance concerning desirable modifications in the PPS program.

Process variables are less expensive and easier to measure. Existing data systems can routinely provide some valuable information. Processes are also the recognized metric of quality of care by many in the medical community. However, the relationship between process changes and patient outcomes is, as we have noted, somewhat uncertain.

Many quality-of-care problems are likely to be specific to individual diagnostic groups. If problem DRGs can be pinpointed early, studies that focus on both processes and patient outcomes in those DRGs may provide the most efficient means of using scarce research resources. Many observers believe that DRGs per se are not as appropriate a target as clinical diagnoses, because of the great heterogeneity of cases within some DRGs and the fact that essentially equivalent patients may end up in different DRGs for reasons having little to do with quality of care.

In this section we identify important variables or effects that could be the focus of studies supported by HCFA; we also suggest diagnostic categories or DRGs that might be appropriate choices for early investigation. Section IV then outlines some specific research efforts that

might be undertaken over the three years remaining before the 1987 impact report.

PROCESS AND OUTCOME VARIABLES

The first tables in this section provide examples of outcome variables that we view as important to any research program directed at PPS and quality of care. The tables are not exhaustive. We have tried to highlight and give examples of areas of greatest concern to the medical or policymaking communities. First, Table 4 suggests possible positive impacts on patients' health status.

In general, however, we see the critical evaluation questions as focusing on undeniably negative effects that must be detected and ameliorated before quality of care has deteriorated too far. Table 5 lists possible negative outcomes related to selected changes in the characteristics of hospitalizations: shorter lengths of stay, changes in admitting practices, less use of expensive specialized units such as ICUs or CCUs, and less use of ancillary services. Table 6 then highlights effects related to reductions in personnel or changes in the mix of support staff, largely nursing personnel. Personnel changes would probably affect most of the outcome measures listed in Table 5, so Table 6 does not repeat all the outcome variables of Table 5.

CANDIDATE DRGS

Tables 7 and 8 list "candidate" DRGs or diagnostic groups that might be of higher priority to study. Table 7 notes our "best guess" of the likelihood and direction of PPS influences on length of stay and use of ancillary services. Table 8 then presents our predictions about the effects on quality of care under specified assumptions about changes in lengths of stay or ancillary services, namely, that these inputs to care would decrease by 25 to 33 percent.[1]

These tables are illustrative, so we have restricted our examples to negative effects, believing these to be the critical policy problem. We emphasize, however, that documenting improvements in "production

[1]Appendix A presents a longer version of Table 8. Included in it are all DRGs (whether pertinent to the Medicare age group or not) for which we could envision a possible deleterious effect on quality of care, on the assumption that inputs to care decreased 25 to 33 percent. It should be regarded essentially as a "draft"; it is included as an example of the type of exercise that might be done before embarking on a large research effort to determine which diagnostic categories are likely to be the most fruitful for investigation. At that time, of course, better specification of the elements of care likely to affect outcomes would doubtless prompt some change in our table entries.

Table 4

POSITIVE EFFECTS OF PPS ON QUALITY OF CARE

Possible Outcomes of Unnecessary Hospitalizations Avoided
No side-effects of optional or marginally needed procedures
No side-effects of unnecessary or excessively powerful drugs (e.g., antibiotics, psychotropic agents)
Fewer negative effects of being a patient when needed service or procedure is done on an ambulatory or day-surgery basis — reduced risk of nosocomial infection — lessened disorientation or emotional distress — decreased worry, concern, and disruption for family members — improved comfort and positive outlook
Possible Outcomes of Changes in Characteristics of Hospitalization
Reduced risk of infection owing to earlier discharge
Improved patient comfort and emotional well-being when discharged home appropriately early
Fewer effects of invasive diagnostic procedures
Benefits of Concentration of DRGs or Procedures in High-Volume Facilities
Lower mortality rates
Lower complication rates
Less time in operating room, quicker return to recovery room, quicker return to ward, quicker discharge
Other Possible Benefits of PPS with Ramifications for Patient Health Status
Improved patient recordkeeping leading to more complete documentation of patient care and improved communication among patient's physicians and to other providers
Greater sensitivity of medical personnel to the financial implications of their services to their patients
Improvements in Medicare data collection and processing systems leading to eventual efficiencies in the program

Table 5

EXAMPLES OF POSSIBLE PPS IMPACTS ON QUALITY OF CARE RELATING TO CHARACTERISTICS OF HOSPITALIZATIONS

Possible Outcomes of Shorter Lengths of Stay

Increase in out-of-hospital deaths, e.g.,
- — within 3 months
- — within 40 days
- — within a very short period post-discharge (e.g., 7 days)

Increase in discharges to skilled nursing homes of patients who previously could have been discharged home at the end of a longer hospital stay, leading to
- — apprehension on part of patient about being sent to nursing home, about paying for care in nursing home, etc.
- — inadequate or delayed recovery because nursing home is not equipped to care for patients who are on average sicker than was previously the case
- — increase in number of people permanently confined to nursing homes.

Increase in level of sickness or distress of patients discharged home, owing to
- — fewer services related to patient education, counseling, or reassurance
- — provision of such services at an inappropriately early time in the admission.

For example:
- — less reassurance about prognosis for patients with acute myocardial infarction, leading to delayed return to leisure activities and delayed resumption of sexual relations
- — less physical therapy, less help with walking for patients with hip replacement, other joint procedures, or back surgery
- — less patient education for women with breast cancer and mastectomy
  - • "Reach for Recovery" program may not reach women at all, or may be too early in the recovery process to be effective
- — less patient counseling for men with major prostate surgery
  - • concern about how to handle incontinence, dribbling, etc.

Patient discharged with chronic or acute condition not fully controlled or stable, for example:
- — fever present or recurrent
- — glucose still elevated to dangerous levels in diabetic patient
- — continued need for oxygen at night for patients with compromised pulmonary function when it would not be needed if the lungs were functioning better

Greater stress on the spouse and/or family, for example:
- — physical stress on a frail spouse who may have to be prepared to turn or lift patient in bed or support patient to walk
- — emotional stress and anxiety over how to bathe, feed, handle medications, change dressings, handle oxygen, and so forth.

Table 5 (cont.)

More morbidity or disability produced by relying on outpatient services for followup — More outpatient visits, more radiology , more laboratory tests in physician offices or free-standing facilities that may provide less high quality services (e.g., poorer x-ray films, less quality control of lab work) — Patient concern about increased out-of-pocket costs (if billed under Part B)
Possible Outcomes of Changes in Admitting Practices
More iatrogenic events if more persons with relatively uncomplicated cases are admitted than had been previously
Increase in non-hospital deaths of patients who are not admitted at all, who are transferred among hospitals, or who do not seek care because of perception of lowered access to care
Increase in morbidity or mental distress or slower recovery for patients whose admissions are delayed because they appear to be high-cost or high-risk patients.
Possible Outcomes of Decrease in Use of Medical ICUs, CCUs, and Post-surgery ICUs (Recovery Rooms)
Increase in in-hospital deaths
Increase in complications or adverse outcomes short of death — hemorrhage or infection in surgical cases — pneumonia or infection in medical cases
Increase in "emergency" transfers to an ICU from wards, owing to incorrect initial placement
Possible Outcomes of Decrease or Change in Use of Ancillary Services
Poorer functional status at discharge owing to — fewer services requiring interaction between providers and patient • physical therapy and occupational therapy — substitution of less costly (but also less appropriate) therapies for ones that may be more efficacious or pose less risk of side effects in some patients • penicillin for cloxacillin for staphylococcal infection • aspirin for nonsteroidal anti-inflammatory agents
Delay in detection or treatment of unrelated conditions because fewer diagnostic services are given — less x-ray or laboratory work — less followup of abnormal results from x-rays or other tests to reach a definitive diagnosis

Table 6

EXAMPLES OF POSSIBLE PPS IMPACTS ON QUALITY OF CARE RELATING TO REDUCTIONS IN THE USE OF HEALTH CARE PERSONNEL[a]

Reductions in Use of Specialized Teams
Elimination of IV teams — poorer quality of venipuncture — more cutdowns needed — IVs started later in an admission — complications from poor IV care (infection, runs dry, etc.)
Replacement of RNs with Lower-Qualified Nurses or Aides
Medications errors — over- or under-dose of chemotherapy agents for malignancy — erroneous substitution of one drug for another
Lowered ability to respond to medical crisis, such as a patient in sudden cardiac distress on the ward
Generalized Reductions in Support or Nursing Staff
Fewer "nursing" services delivered to patient — dressings changed every second or third day instead of every day — less monitoring of fluid intake and output — less turning of bedridden patient, less help with eating, bathing, toileting, walking post-operatively, etc. — more reliance on "technology," such as nasogastric feeding instead of hand feeding
Lowered ability to respond to medical crisis in understaffed units, such as OR recovery rooms
General Reductions in Physician Services (Full-Time Hospital-Based MDs)
Fewer pre-operative visits from anesthesiologists — greater anesthesia complications or misadventures
Less post-operative follow-up — complications or delayed recuperation
Less effective use of consultants — delayed or missed diagnoses

[a]Possible outcomes of changes in use of personnel or reductions in per-patient support staff are, in general, the same as those noted in Table 4. Measures related to mortality might be less likely to occur than those related to complications and health status (e.g., physical functioning).

Table 7a

CANDIDATE DIAGNOSTIC CATEGORIES FOR QUALITY-OF-CARE STUDIES: PPS EFFECTS ON CHARACTERISTICS OF HOSPITALIZATION

Common DRGs for Persons 65 and Older[b]		Is PPS Likely To Bring About:[a]		
No.	Name of Group	Shorter Stays	Fewer Diagnostic Services	Fewer Therapeutic Services
132	Atherosclerosis[c]	+	+	+
39	Lens procedures	?	–	–
182	Esophagitis, gastroenteritis, misc. digestive disorders[c]	+	+	–
127	Heart failure and shock	++	++	+
88	Chronic obstructive pulmonary disease	++	+	+
14	Specific cerebrovascular disorders except transient ischemic attacks	?	?	?
89	Simple pneumonia and pleurisy[c]	++	+	+
294	Diabetes (age > 35)	+	+	+
122	Circulatory disorders with acute MI, no cardiovascular complications (disc. alive)	?	?	–
243	Medical back problems	+	+	+
138	Cardiac arrhythmia and conduction disorders[c]	?	?	–
134	Hypertension	+	+	+
140	Angina pectoris	?	?	–
15	Transient ischemic attacks	?	?	?
336	Transurethral prostatectomy[c]	+	+	?
96	Bronchitis and asthma[c]	++	+	+
174	Gastrointestinal hemorrhage[c]	?	?	–
82	Respiratory neoplasms	?	?	+
320	Kidney and urinary tract infections[b]	?	?	–

[a]– means no effect; ? means uncertain but possible effect; + means likely effect; ++ means strongly likely effect.

[b]Source: Pokras (1984).

[c]One of a pair of DRGs distinguished by age (>69) or the presence of complications and comorbidities.

Table 7b

SELECTED DIAGNOSTIC CATEGORIES FOR QUALITY-OF-CARE STUDIES: PPS EFFECTS ON CHARACTERISTICS OF HOSPITALIZATION

Selected Medical or Surgical "High-Variation" Diagnostic Categories[b]	Is PPS Likely To Bring About:[a] Shorter Stays	Fewer Diagnostic Services	Fewer Therapeutic Services
Medical Causes of Admission			
Nutritional and metabolic diseases	?	?	?
Syncope and collapse	–	?	–
Urinary tract stones	+	+	+
Digestive malignancy	+	?	+
Gastrointestinal obstruction	–	–	–
Peripheral vascular disorders	?	?	?
Deep-vein thrombophlebitis	?	?	?
Chest pain	–	?	–
Minor skin disorders	?	?	?
Trauma to skin, subcutaneous tissue, and breast	?	?	?
Peptic ulcer	+	+	+
Disorders of the biliary tract	+	+	+
Surgical Causes of Admission			
Hysterectomy	+	?	?
Major cardiovascular operations	+	+	+
Hand operations except ganglion	?	?	?
Foot operations	?	?	?
Major joint operations	+	?	+
Stomach, esophageal, and duodenal operations	+	?	?
Back and neck operations	?	?	?
Soft-tissue operations	?	?	?
Knee operations	+	?	+
Uterus and adnexa operations	+	+?	?
Extraocular operations	?	?	?

[a]– means no effect; ? means uncertain but possible effect; + means likely effect; ++ means strongly likely effect.

[b]Source: Wennberg et al. (1984). Actual DRG numbers are not given for these "modified" DRG classifications (see Table 3 of the original).

Table 8a

DIAGNOSTIC CATEGORIES IN WHICH QUALITY OF CARE MAY BE AFFECTED

Common DRGs for Persons 65 and Older[b]		Is Quality of Care Likely To Be Affected Adversely By:[a]		
No.	Name of Group	Shorter Stays[c]	Fewer Diagnostic Services[c]	Fewer Therapeutic Services[c]
127	Heart failure and shock	–	–	+
88	Chronic obstructive pulmonary disease	+	–	+
14	Specific cerebrovascular disorders except transient ischemic attacks	–	+	–
89	Simple pneumonia and pleurisy[d]	–	+	++
294	Diabetes (age >35)	+	–	–
243	Medical back problems	+	–	–
138	Cardiac arrhythmia and conduction disorders[d]	++	++	+
134	Hypertension	–	–	+
140	Angina pectoris	+	+	+
15	Transient ischemic attacks	–	+	–
336	Transurethral prostatectomy[d]	++	–	–
96	Bronchitis and asthma[d]	+	+	++
174	Gastrointestinal hemorrhage[d]	+	++	+
82	Respiratory neoplasms	–	+	++
320	Kidney and urinary tract infections[d]	+	+	+

[a]– means that harmful effects are considered unlikely; + that harmful effects are possible; and ++ that harmful effects are quite likely.

[b]Source: Pokras (1984).

[c]The underlying assumption is that the use of services has been reduced by 25 to 33 percent on average.

[d]Indicates one of a pair of DRGs distinguished by age (>69) or presence of complications or comorbidities.

Table 8b

DIAGNOSTIC CATEGORIES IN WHICH QUALITY-OF-CARE MAY BE AFFECTED

Selected Medical or Surgical "High-Variation" Diagnostic Categories[b]	Is Quality of Care Likely To Be Affected Adversely by[a]		
	Shorter Stays[c]	Fewer Diagnostic Services[c]	Fewer Therapeutic Services[c]
Medical Causes of Admission			
Deep-vein thrombophlebitis	+	+	+
Peripheral vascular disorders	–	+	+
Syncope and collapse	–	++	–
Chest pain	+	++	–
Gastrointestinal obstruction	++	+	++
Disorders of the biliary tract	+	++	–
Nutritional and metabolic diseases	–	++	–
Urinary tract stones	+	–	+
Surgical Causes of Admission			
Major cardiovascular operations	+	–	+
Stomach, esophageal, and duodenal operations	+	+	++
Major joint operations	–	–	+

[a]– means that harmful effects are considered unlikely; + that harmful effects are possible; and ++ that harmful effects are quite likely.

[b]Source: Wennberg et al. (1984). Actual DRG numbers are not given for these "modified" DRG classifications (see Table 3 of the original).

[c]The underlying assumption is that the use of services has been reduced by 25 to 33 percent on average.

efficiency" and "clinical efficacy" will also be important steps in helping the medical community redefine the norms of clinical practice.

One specific class of DRGs deserves special comment. Conditions with high variation in admission rates across small geographic areas presumptively include many cases that might be handled on an outpatient basis or in day surgery. Consequently, shorter lengths of stay or fewer ancillary services will not necessarily result in lower quality of care *on average*. However, if only the sickest patients remain to be treated in hospitals and if care to them is curtailed, then quality might be harmed for that subset of patients.

The DRGs in Tables 7 and 8 are included chiefly because they account for a high proportion of Medicare admissions (Pokras, 1984). The diagnostic groups represent conditions for which both admission and level of services once admitted are highly discretionary. The degree of discretion is reflected in extremely high rates of variation in admissions across hospital market areas, with ratios of high- to low-use areas exceeding 3.5 in some cases (e.g., cardiac arrhythmias) and 8.5 or more in others (e.g., chest pain) (Wennberg et al., 1984).

Table 8 does not track Table 7 exactly. For some conditions, we could not envision detecting adverse effects on quality of care from reductions in lengths of stay or ancillary services of the magnitude specified (e.g., decreases of 25 to 33 percent). Consequently, those have been eliminated from Table 8.

Space does not permit a full accounting of the clinical rationales for specifying an adverse effect on quality of medical care in a hospital functioning under a prospective payment system. Some examples of the circumstances or changes in care that might be observed include the following.

For heart failure and shock, lower use of therapeutic services might take the form of omission of certain patient monitoring activities (e.g., those requiring intra-arterial or Swan-Ganz catheters) or less reliance on appropriate, but costly, drugs. For chronic obstructive pulmonary disease, shorter lengths of stay might lead to patients being discharged febrile, with unstable heart rate or rhythm, with unstable respiratory rate, with unstable blood gases, on supplementary oxygen, unable to ambulate easily, or unable to perform various activities of daily living.

For stomach, esophageal, and duodenal operations, a number of "high-technology" diagnostic tests will elucidate the cause of upper gastrointestinal problems; one or more of these tests might truly be useful for a given patient. No doubt, reduction in the use of such tests in a workup could be tolerated, but at some point curtailing their use might eliminate, in some patients, certain tests that would have fostered better choices as to type and technique of the surgery to be performed.

For transurethral prostatectomy, shorter lengths of stay might be reflected in discharges before enough time has passed safely to conclude that the possibility of urinary tract bleeding is low, or before it is certain that the patient has not suffered serious complications from the procedure.

Examining quality of care at this level of clinical detail requires at least inpatient medical record data. Ideally, post-discharge followup would be better. Administrative data such as those from the Medicare Part A and Part B files or even discharge abstract data such as those from the Commission on Professional and Hospital Association will not suffice, especially when the issue is one of tests not performed or services not given.

We have tried to be conservative in specifying the likelihood of quality-of-care effects in Table 8. Hence, higher priority might be given to studying those diagnostic categories showing possible changes in Table 7 *and* possible adverse effects in Table 8.[2] These include, for instance, heart failure, pneumonia, acute or chronic bronchitis, prostatectomy, chronic obstructive pulmonary disease, urinary tract stones, and diseases of the biliary tract. Of these, all but the last two are among the more prevalent DRGs among the elderly.

Of course, target diagnostic groups could be selected on other criteria. For example, important DRGs might be those for which inpatient care is believed instrumental in averting deaths or disability or in restoring functional capacities or emotional well being. Another criterion might be expense, with the choice being "more costly" (higher weighted) DRGs.[3]

Yet another criterion might be heterogeneity of cases *within* individual DRGs. DRGs can differ, for instance, according to diagnoses or patient complexity and severity of illness. One would study very heterogenous DRGs because of the greater range of effects that changes in services might have relative to very homogenous DRGs.

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[2]We also attempted to identify groupings with a greater likelihood of showing increased readmission rates in the PPS environment. On clinical grounds, we would predict a substantially greater (than "average") probability of readmissions for heart failure and shock (DRG 127) and angina pectoris (140), and a somewhat greater probability for chronic obstructive pulmonary disease (88), simple pneumonia and pleurisy (89), bronchitis and asthma (96), cardiac arrhythmias (138), gastrointestinal hemorrhage (174), diabetes (294), and kidney and urinary tract infection (320), as well as for deep vein thrombophlebitis, gastrointestinal obstruction, major cardiovascular operations, and stomach, esophageal, and duodenal operations.

[3]For FY85, about 60 DRGs will have weights of 2.0 or higher; about 35, weights of 2.5 or higher; and about 14, weights of 3.0 or higher. Most of those with the higher weights are cardiac procedures, and they are not among the more common DRGs for the Medicare population.

Finally, choice of conditions might be based on the likelihood that a patient would be discharged to home health agency care or to a nursing facility; quality-of-care assessments would then need to be done for both inpatient and post-discharge management. Analogous reasoning draws attention to conditions having a higher probability, given PPS, of being treated on an outpatient basis, so that patients never reach the hospital although previously they might have been admitted. DRGs in the Medicare age group that might show a marked propensity to shift into the ambulatory setting (for reasons of changing medical technology or medical community standards) include carpal tunnel release, dental extractions and restorations, arthroscopy, breast biopsy, and perhaps atherosclerosis and hypertension.

IV. A PROPOSED RESEARCH AGENDA FOR QUALITY OF CARE

INTRODUCTION

Developing a research agenda presupposes a time frame, some notion of an overall strategy to address the important policy issues, and a set of criteria that implicitly or explicitly guides the choice of research projects. The basic time frame for this agenda is driven by two factors: (a) the need for HCFA to produce several Congressionally mandated impact reports, of which the last currently required (for FY87) is the most important, and (b) the supposition that, despite the number and quality of research efforts up to that time, many policy questions about PPS impacts will be unresolved.

The strategy proposed here has three main elements.[1] "Administrative" data would be used for program monitoring and, where possible, for research. Those data would be supplemented with grant or contract work. Research projects that require specialized data collection (such as medical record abstraction) and that incorporate a clinical perspective would be performed.[2]

Criteria that might be used to direct the research agenda in this area fall into five broad categories. First is the likely utility, persuasiveness, and validity of research projects for policymakers, the medical community, and the public at large. Second are questions of data: Can they can be acquired quickly? How thorough are they? How medically valid? Third is the probability of obtaining useful findings at least by 1987. Selecting areas of expected problems and targeting research efforts there is a fourth criterion. Finally, costs cannot be overlooked in selecting among otherwise equivalently appealing allocations of research resources.

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[1]In late November 1984, the Office of Research and Demonstrations, HCFA, hosted a large conference to outline priority research areas. Background materials included a "matrix" that highlighted priority areas in the short, mid, and long term (FY85-FY90 and beyond) for Medicare and Medicaid. Quality, grouped with coverage, issues specified refining hospital quality-of-care measures, evaluating PPS effects, developing and improving monitoring systems, and generally "measuring the quality and appropriateness of care." Recommendations for a research agenda given in this report fit well within these broad (in fact quite ambitious) parameters.

[2]The conference also described a new support instrument, the cooperative agreement. Unresolved as of this writing is whether the cooperative agreement is to be managed as a contract or a grant. The issue has substantial implications for the research community, as it raises the possibility of review and oversight by the Office of Management and Budget of research activities that previously would not have been subject to OMB regulations.

Following the strategy and incorporating these criteria, we have outlined a three-year research agenda about the impact of PPS on quality of care that involves the activities listed just below. They are discussed in more detail in the rest of this section.

1. Studies to accumulate relatively broad information concerning quality-of-care outcomes over the next three years and to establish a baseline for future work. Such studies should permit administrative data to be used to infer likely patient outcomes in a variety of settings (e.g., regions, hospitals).
2. More intensive and rigorous studies, centered probably on critical diagnoses, procedures, or DRGs. These will examine both the processes and outcomes of care. At least one such study should examine quality of care directly.
3. Maintenance of a limited reserve of resources for use in the latter half of the period to deal with puzzling or unanticipated issues raised by the studies just outlined.
4. Another iteration of the research planning process to sustain the quality-of-care work beyond 1987.

Intramural and Extramural Research

Research activities will be shared between intramural and extramural investigators. Working with administrative data is more the province of in-house efforts, perhaps supplemented by outside research on methodology. Studies of "early warning" indicators is probably best done in house because of the useful communications that can be effected through the bureaucracy. In contrast, research requiring specialized data collection in the field is a more appropriate subject for extramural projects.

Intramural Research. OR staff have a special role in developing baseline data and in documenting trends in the use of services and facilities. In-house resources might also be devoted to (a) monitoring changes in the hospital environment, such as changes in support staffing patterns, (b) detecting and documenting changes in hospital case mix, such as whether certain procedures or DRGs are becoming concentrated in certain (types of) hospitals, and (c) determining whether the percentage of cases in more complex or procedure-related DRGs is rising.

Further, OR staff can monitor "global" outcome measures, such as changes in mortality, using all the Medicare statistical system data bases at their disposal. For instance, data from the Part A Hospital

Bill Record reflect in-hospital deaths; information on dates of death from the Health Insurance (HI) Master File permits post-discharge deaths to be detected (although with a time lag of several months). Finally, OR staff can track some changes in diagnosis and procedure coding that are sure to be an early reaction to PPS implementation.[3]

Extramural Research. External research (i.e., extramural grants, contracts, and cooperative agreements) has a broader role. First, some types of investigations undertaken by in-house staff will probably need to be augmented or complemented by more detailed work done on the outside. For example, documenting changes in case mix will require much more research into staging techniques and methods for assigning severity-of-illness scores.

Second, research using medical record reviews or patient or provider interviews will be unavoidable if a reasonably full picture of quality of care is desired. Most experts believe that such studies must include inpatient care, pre- and post-admission outpatient care, and care rendered by skilled nursing facilities and home health agencies. Some also argue for evaluating outcomes of patients who are never admitted at all (but who, in pre-PPS days, might have been). In all these cases, collaboration and assistance of physicians, nurses, nursing home staff, home health care providers, and the like are absolute prerequisites. These factors all call for extramural projects.

Third, specific models of how changes in the process of care or in the structural characteristics of providers are related to the patient's health status and well-being must be explored. Unlike patient outcomes, these are the "practice style" variables factors most amenable to change (in the long, if not the short, run) by physicians, nurses, hospital administrators, and other providers. Without studies that demonstrate the linkages, it is difficult to see how reliable and valid program monitoring based on administrative data and concerned with patient outcomes can be conducted.

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[3]Important elements of the Part B (Supplemental Medical Insurance) data base, namely, patient identifiers and detailed procedures codes, are not reported to HCFA by the carriers. This presents a significant obstacle to performing such tracking completely within OR. HCFA is currently trying to develop a file (the "Medicare Automated Data Retrieval System") that merges Parts A and B information on a sample of beneficiaries, which may overcome some of these problems. Distinguishing coding changes in the Part A files induced by PPS from actual changes in services provided may benefit from use of data bases that have already been developed for other purposes, such as the data bases of the Commission on Professional and Hospital Activities (which are derived from discharge abstracts, short claims data. Ultimately, primary data collection efforts may be needed, however.

Other Aspects of the Research Agenda

Targeting. Virtually none of the research carried out within this agenda can be as broad as policymakers and investigators would like. Targeting on problem areas will be critical to planning and conducting all projects done in the next few years. Especially important is whether the problems are emerging in certain geographic regions of the country, in specific DRGs, diagnoses, or procedures, in classes of hospital, in types of patients, or in specific categories of beneficiaries (e.g., Medicaid/Medicare crossovers).

Giving special attention to the positive and negative expected impacts of PPS on quality of care, as outlined in Tables 4–6, is one approach to targeting research. Targeting can be directed toward specific conditions or procedures for which the nature and number of ancillary services needed are "less discretionary," diagnoses for which the use of CCU or ICU might be important (e.g., acute MI), conditions that are important simply because they are common, and so forth. Tables 7 and 8 highlighted disorders that might be early candidates for special study based on prevalence, range of per-population admission rates, potential effects of PPS on the process of care, and possible effects of such process-of-care changes on patient outcomes.

Targeting on DRGs or diagnoses is not the only option, and over the long run may not even be the best choice. Targeting on types of hospitals might prove especially productive; criteria for inclusion might be size (small numbers of beds), high proportions of Medicare patients relative to their entire patient base, or provisional JCAH accreditation. Hospitals likely to find their financial position worsened by PPS, such as inner city community hospitals with high bad debt and charity (i.e., unreimbursed) caseloads, might be especially important to study over the years.

Finally, as the effects of PPS begin to ripple through the medical care systems, some types of patients may come to be seen as being at greater risk of negative effects than other patients. These include persons with conditions normally responsive to either medical or surgical treatment who receive the latter without an adequate trial of the medical intervention, severely ill or poor patients who may be discharged prematurely, and persons who never are admitted although hospitalization might have been justified medically.

Relationship to HSQB. Information acquired by HSQB as part of its PRO program monitoring responsibilities might prove useful to OR in preparing the quality sections of the impact reports or in spotlighting potentially fruitful research areas. Data collected for program management purposes are ordinarily not suitable for research purposes;

furthermore, HSQB has an enormous programmatic effort to get under way. Nonetheless, both anecdotal information and formal reports submitted to HSQB may be quite helpful over the longer run.

Thus, early and continuing collaboration between OR and HSQB is important. OR might, for instance, aid HSQB in standardizing the way quality-related administrative data are collected and recorded by the PROs, if such information were ever to be used for research purposes. The PROs themselves might be enlisted to participate in research projects that involve medical record abstraction and audit of hospital charts.

EXAMPLES OF STUDIES FUNDED OR PLANNED

Nonintrusive Outcome Measures

One multi-year study that will get under way in FY85 is directed at developing a set of clinically plausible patient outcome measures from administrative data, namely, the Part A Hospital Stay Record file.[4] Such outcome measures are called "nonintrusive measures" because they are intended to be used with administrative data and reduce the need for primary data collection from medical record abstraction or direct patient contact. Before they can be applied to program monitoring or evaluation (for instance, by the PROs), however, the *clinical* links between potentially adverse patient outcomes and poor processes of care must be established.

Identifying candidate outcome indicators will be done on nearly 100 percent of the admissions in the FY84 Part A Hospital Bill Record file, supplemented by data from the Medicare Provider of Service file and the HI Master File. The study is not, however, a longitudinal or "before/after" evaluation of PPS (for that, see "Medical Record Audit," below).

Indicators may include (but not be limited to) the following: in-hospital and post-discharge mortality; readmissions of surgical patients owing to procedure-related complications; readmissions of medical patients owing to inadequate recovery, complications, or relapse; or occurrence of various "iatrogenic" or unexpected adverse events such as myocardial infarction or skin ulcers. Nonintrusive outcome measures, based on such indicators, would be more narrowly restricted to specific diagnoses or procedures and expressed in terms of rates.

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[4]This project, "Nonintrusive Outcome Measures: Identification and Validation," was awarded to The Rand Corporation as Cooperative Agreement 15-C-98684/9-01. Co-Principal Investigators are Kathleen N. Lohr, Ph.D., and Mark R. Chassin, M.D.

Several outcome measures will then be validated against process-of-care information from hospital medical records. Criteria for selecting measures for field work include: (a) ability to define and measure the problem from Medicare data; (b) evidence of variation in these outcomes by class of hospital or type of patient; (c) specific relationship to important or common diagnoses or procedures (and probably not DRG-specific); (d) evidence of a strong medical consensus that inpatient care is necessary to improved health status; and (e) high likelihood that relevant medical and nursing process of care information will be available in a hospital chart. The main question is whether poor performance according to the outcome measures is related to inferior patient care. Chart information will be obtained from types of hospitals that appear to be performing well, about average, or poorly on the measures selected for validation.

In the longer run, the study will yield clinically valid and reliable tools for HCFA and other researchers to use in assessing impacts over time. Furthermore, such nonintrusive measures should apply beyond prospective payment in Medicare to quite different approaches to financing of inpatient care.

Medical Record Audit of Marker Conditions

In accordance with the already identified need for direct assessment of patient care under PPS, a pilot study is also planned (as of this writing) for FY85, with a proposed national study to follow. These projects will focus on medical and nursing processes and outcomes of care within a hospital stay, seeking the clinical linkages that have usually not been emphasized in such work. Data will be collected for two periods, probably 1981 and 1985, to provide a "before/after" comparison of PPS impacts on inpatient care.

These studies are to be based exclusively on medical record abstraction and data analysis. They will focus on a relatively few, carefully selected diagnostic categories that cut across several DRGs and represent a variety of medical and surgical specialties. Possible conditions include myocardial infarction, bronchitis and pneumonia, gastrointestinal hemorrhage, hip fracture, prostate hypertrophy and prostatectomy, and colorectal cancer. Within conditions, the studies will account for patient complexity (severity of illness) and sociodemographic characteristics. (The pilot study may be confined to the Los Angeles area and to hip fractures.) If the national study is funded, great care will be given to selecting study sites and hospitals that will allow results to be broadly generalized.

The main tasks of the pilot study would be to develop data collection instruments and abstractor training manuals and to test them on a representative sample of Medicare patients hospitalized before and since PPS began. Data collection and analysis and final touches to the entire methodology are expected to be completed by the end of FY85.

OTHER RESEARCH TOPICS OF IMMEDIATE CONCERN

The HCFA Office of Research has neither the resources nor the time (before the FY87 impact report deadline) to support research activities on all the fronts that would be desirable. We outlined above two areas deserving primary consideration: (a) using administrative data to monitor changes in mortality, readmissions, and other such indicators, and conducting research to improve upon those measures; and (b) mounting at least one nationally generalizable study to evaluate quality of care directly in pre- and post-PPS years. The following topics warrant attention as soon as feasible.

Evaluating Long-Term or Home Health Care

One area of immediate concern is the quality of care provided *in long-term-care facilities* and by personnel from *home health agencies*, especially as patient caseloads become, on average, more seriously ill. Several factors argue for attention to this issue.

The amount of care delivered by these providers is sure to increase over the next several years (partly independent of PPS). Care in nursing homes is known to be suboptimal, even without increased caseloads (or caseloads of greater severity). Methods to evaluate such care are even less well developed than those usually employed to assess care in acute general hospitals or in the ambulatory setting. Little baseline information is available, and we see great value in developing relevant baseline data before DRGs are extended into these areas. In short, apart from direct assessment of the impacts of PPS on quality per se, perhaps no topic causes greater concern than the level of care in nursing homes, and we see it as a major and legitimate target for continued HCFA research.[5]

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[5]In commenting on this report, Professor Avedis Donabedian argued that studying nursing home care has probably the single highest priority. He emphasized questions of the technical quality of nursing homes, such as whether they have the requisite equipment, personnel, and skills to provide needed care (especially as patient case mix changes) and to recognize developments that require upgrading in the level or location of care.

Evaluating Patient Outcomes After Discharge

A second target for research requires taking a *longer view of the outcomes of inpatient care*, by following patients after discharge. Something can be inferred about patient outcomes and quality of inpatient care by looking at readmissions owing to complications or death as indicators of possible poor outcomes, even using essentially administrative data (Gaumer and Cromwell, 1983). Going beyond these steps is necessary, however, to understand more fully the effects of PPS on the elderly.

Two points are relevant: First, the level and complexity of services delivered on an outpatient basis will expand, as hospitals increasingly try to adapt to PPS by unbundling services to the ambulatory sector. The question is whether patient health status is harmed, improved, or left unchanged by the provision of such care in a wholly different way.

Second, it seems unreasonable to claim that one has a full picture of the impact of PPS on quality of care if one has not made some effort to evaluate the functional and emotional well-being of patients at various points post-discharge. Little or no pre-PPS data are available in this area. Nevertheless, given PPS incentives to underservice in the hospital setting, the face validity of any evaluation can be questioned if it does not attempt to understand outcomes that may occur once a patient has been discharged.

Evaluating Ambulatory Care

Related to this is the question of the quality of outpatient care both for patients before admission and for those who are now treated exclusively on an ambulatory basis. One of the consequences of PPS whose effects on quality are more than usually ambiguous is *substitution of care outside the hospital for that inside it*—including that received by patients who can be presumed to have been kept out of the hospital altogether. The marked emphasis of the PRO program on shifting as much surgery as can be safely moved to outpatient settings is a case in point. The scope of inquiry must be widened, in short, to non-hospital and pre-hospital as well as post-hospital care.

Patient Satisfaction

The degree to which Medicare beneficiaries are satisfied with the program and their care is not a sufficient outcome variable in quality-of-care terms, although it may be a necessary one. Patient satisfaction measures can be a powerful tool in highlighting areas of concern to the

elderly, particularly interpersonal relations with health care providers, the site of care, and the convenience and other amenities of care.

Medicare beneficiaries may, of course, report no change in their satisfaction with Medicare under PPS—i.e., they may perceive no change in levels or types of care or access to care, or they may see change but consider quality of care unaffected. They may sense no change in quality of care—narrowly defined—but experience a significant transfer of the burden of paying for this care that imparts a good deal of dissatisfaction with (if not lowered access to) care. Although again there are no "before" data on which to base an assessment about *change* in patient satisfaction, nonetheless a research effort in this area might provide useful information as PPS becomes more established for inpatient care and is possibly extended to other providers.

OTHER RESEARCH TOPICS OF FUTURE CONCERN

Effects of PPS on quality of care may not begin to be felt for another year or two, because neither hospitals nor physicians will adjust instantaneously to this radical change in their fiscal environment. We cannot know today *precisely* what tomorrow's issues may be, and we cannot say for certain that phenomena expected in the next two years or so will in fact be attributable to PPS. Answering this "attribution" question requires understanding the status quo ante, following early reactions through to a "steady state" of PPS implementation, understanding secular trends or other external shocks to the medical care delivery system, and in general keeping track of the PPS intervention itself over the longer run.

The mandated impact reports constitute a significant responsibility for the Office of Research. The studies outlined above will feed into the last of the series. Nonetheless, there will be no dearth of policy issues needing investigation beyond that time, and research on the impacts of PPS will not end in 1987.

Planning research is an iterative process. What is learned from early studies points to what to look at next. Thus, coming to a good understanding of what the impacts of PPS have been on quality in the first few years will be vital to designing a research agenda for the remainder of the decade. We conjecture that the following three areas of research may prove especially important.

First is the continuing need to *improve methods of assessing quality of care*, especially for the elderly and especially in settings other than acute hospitals. Work should continue on developing good measures of severity of illness and staging. Quality-assessment methods based on

insurance claims data should be improved; process/outcome relationships must be further examined. Finally, studying inpatient and outpatient care together for entire episodes of care or for so-called "boundary-crossing conditions" will be crucial to a full evaluation of PPS.

Second is the application of theory and extant methods to *assessing* impacts of *likely extensions of DRG-based payment.* Two to three years from now, the nation may well be into DRG-based payment for skilled nursing homes and inpatient physician services; increasing numbers of states may adopt "all-payer" legislation that is sure to affect Medicare. Assessing quality in long-term-care facilities may acquire especially high priority for research, because if liability for long-term-care expenditures is shifted away from Medicaid to Medicare, this will become an even more important prospective-reimbursement issue. The same or similar issues of quality will arise, and they will be no less knotty to study than care in acute, short-stay hospitals will have been.

Finally, *PPS may not solve the problems it was expected to solve.* In this event, policymakers and legislators may choose to tinker with PPS; alternatively, they may choose to replace it with other cost-control mechanisms such as global budgeting or capitation. Undoubtedly, the Office of Research is under great pressure to describe and document what is happening with PPS now. Nonetheless, we think that some small efforts to look ahead and contemplate the research needs of a rather different Medicare financing environment would be worthwhile.

SUMMARY

This document has outlined a framework that the Office of Research might use to structure evaluations of certain effects of prospective payment. Quality of care given to Medicare beneficiaries, especially patient outcomes, is the chief concern. Certain themes for this research effort should be stressed.

First, the overall research agenda must be strong enough to detect clinically meaningful impacts on patient outcomes and strong enough for reasonable people to assign those impacts to PPS. Better models that relate structure and process to outcomes for diagnoses of interest will be needed. The "reasonable person" test might then be said to be met if process measures and patient outcomes change in the ways predicted by such models.

Second, outcomes other than death must be examined. Even when mortality rates are the only readily available measure of impact, deaths

occurring in hospital *and* within different periods post-discharge should be considered. Eventually, functional status after hospitalization, length of time to full recovery, mental and emotional health, and other facets of quality of life for the elderly must be addressed, if we are to say that quality of care has been fully evaluated.

Third, the effects of PPS, if translated into reduced inputs such as shorter lengths of stay or fewer ancillary services provided, will influence patient outcomes differently, depending on the nature of the services changed and, more important, the types of patients affected. Hence, interpreting the impacts of PPS requires understanding the clinical circumstances of Medicare patients. This in turn requires active participation of hospital, medical, and nursing communities in quality-related research.

Fourth, being able to monitor changes in quality through secondary data is an important capability, so developing better outcome measures is essential. However, adequate comprehension of PPS effects, especially in the early years, requires information from medical records, if the evaluations are to be believed by the medical community and the Medicare population. Research involving direct patient and provider contact is desirable.

Fifth, targeting impact studies on high-priority topics (e.g., types of patients, crucial or common diagnoses and conditions, certain procedures, and classes of hospitals) will be unavoidable. Criteria by which topics are selected will be needed very quickly. Focusing on diagnoses or DRGs where adverse effects on quality seem likely is perhaps the best initial approach, because it is tied to expected (or observed) changes in medical care delivery brought about by PPS and because it is linked most directly to clinical issues of concern to physicians. Taking account of the full range of patient complexity is crucial for any before/after comparison study.

Sixth, policymakers, Medicare beneficiaries, and the medical and hospital communities should all recognize that developments (good or bad) in the first year or two of PPS may not accurately reflect conditions when prospective payment reaches a steady state. A full picture of the effects of PPS requires a long-term perspective, one that extends beyond FY87.

Appendix A

POSSIBLE IMPACTS OF PROSPECTIVE PAYMENT SYSTEM ON SELECTED DRGS

The DRGs in the following table may be especially important for quality-of-care analyses, because their content suggests the possibility of adverse effects on quality of care if length of stay and/or the quantity and type of hospital services decrease as a result of any prospective payment system. DRGs pertinent to all age ranges are included. In constructing this table, we assume that a "shorter" length of stay means a 25 to 33 percent reduction in the mean length of stay and that a 25 to 33 percent decrease in the (constant) dollar value of services is the degree of cutback in such services. If a DRG is often handled on an outpatient basis or on a same-day in-and-out-of-the hospital basis, we invariably considered shorter stays to have no likely adverse effect on the quality of care.

DRGs in this table (referenced in numerical order in the first column) are restricted to those where at least one PPS-related change may have adverse consequences for patients. In the column labeled "Name of Group," the leading digit refers to the Major Diagnostic Category (MDC) , and the abbreviation (Surg., Med.) to the first classification split within the MDC. "C.C." refers to comorbidity and complications; "O.R. proc" to operating room procedure; "G.I." to gastrointestinal; "C.V." to cardiovascular; "AMI" to acute myocardial infarction; and "exc" to excluding.

In the three remaining columns, ++ means that we believe that some adverse impact on quality is quite likely to ensue from a reduction in stay or services of the magnitude assumed above; + means that PPS may lead to negative effects; and – means that harmful effects would be unlikely. In general, we have been very conservative in specifying if a negative impact might occur; i.e., we have leaned toward giving –'s when in doubt.

Several considerations restrict the immediate applicability of this table. First, most experts believe that PPS quality-of-care research should be targeted on the conditions patients actually have, not on the DRG into which they may be placed (more or less idiosyncratically). A good example is chronic obstructive pulmonary disease, which may cut across as many as six DRGs.

Second, the extreme heterogeneity of some DRGs renders development of appropriate evaluation criteria extremely difficult. For example, specifying process-of-care variables for DRGs 174 and 175 (gastrointestinal bleeding) is complicated by the fact that those DRGs refer to bleeding from any place in the GI tract and for many different reasons; care for such patients can involve a large number of possibly useful but often discretionary tests and procedures.

Third, practice styles and underlying trends in hospital care make these "average estimates" of impact rather imprecise. For instance, a one-third reduction in hospital stay in the Northeast might occasion relatively little effect (stays being already quite long in that part of the country), whereas a similar proportional reduction in the West (where length of stay is, comparatively, quite short) might have considerable impact on patient outcomes. In short, we caution against interpreting this illustrative table as definitive, but we view it as a useful starting point for guiding the "targeting" aspect of any research agenda.

Table A.1

DIAGNOSTIC CATEGORIES RELATING TO MEDICARE AND NON-MEDICARE PATIENTS IN WHICH SOME ADVERSE EFFECT OF PPS ON QUALITY OF CARE MIGHT BE ANTICIPATED

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
4	1 Surg: Spinal procedures	++	+	–
9	1 Med: Spinal disorders plus injuries	++	+	–
14	1 Med: Specific cerebro-vascular disorders except TIA	–	+	–
15	1 Med: Transient ischemic attacks (TIA)	–	+	–
18	1 Med: Cranial + peripheral nerve disorders age >69 and/or C.C.	+	+	–
20	1 Med: Nervous system infection except viral meningitis	++	++	++
22	1 Med: Hypertensive encephalopathy	++	–	+
23	1 Med: Nontraumatic stupor + coma	–	+	–
24	1 Med: Seizure + headache >69 and/or C.C.	–	+	–
25	1 Med: Seizure + headache age 18–69 w/o C.C.	–	+	+
26	1 Med: Seizure + headache age 0–17	+	–	–
28	1 Med: Traumatic stupor + coma, coma <1 hr age>69 and/or C.C.	–	++	–
34	1 Med: Other disorders of nervous system age >69 and/or C.C.	–	+	+
35	1 Med: Other disorders of nervous system age <70 w/o C.C.	–	+	+
36	2 Surg: Retinal procedures	+	–	–
42	2 Surg: Intraocular procedures except retina, iris + lens	+	–	–

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
44	2 Med: Acute major eye infections	+	+	–
49	3 Surg: Major head + neck procedures	+	+	–
64	3 Med: Ear, nose + throat malignancy	–	+	–
65	3 Med: Dysequilibrium	–	++	–
67	3 Med: Epiglottitis	+	–	–
68	3 Med: Otitis media + URI age >69 and/or C.C.	+	–	–
75	4 Surg: Major chest procedures	+	+	++
76	4 Surg: O.R. proc on the resp system except major chest with C.C.	+	–	+
77	4 Surg: O.R. proc on the resp system except major chest w/o C.C.	+	–	+
78	4 Med: Pulmonary embolism	+	–	–
79	4 Med: Respiratory infections + inflammations age >69 and/or C.C.	++	+	++
80	4 Med: Respiratory infections + inflammations age 18–69 w/o C.C.	+	–	+
81	4 Med: Respiratory infections + inflammations age 0–17	+	–	+
82	4 Med: Respiratory neoplasms	–	+	++
83	4 Med: Major chest trauma age >69 and/or C.C.	+	–	++
84	4 Med: Major chest trauma age <70 w/o C.C.	+	–	+
85	4 Med: Pleural effusion age >69 and/or C.C.	–	++	–
86	4 Med: Pleural effusion age <70 w/o C.C.	–	+	–
87	4 Med: Pulmonary edema + respiratory failure	–	–	++

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
88	4 Med: Chronic obstructive pulmonary disease	+	−	+
89	4 Med: Simple pneumonia + pleurisy age >69 and/or C.C.	−	+	++
90	4 Med: Simple pneumonia + pleurisy age 18–69 w/o C.C.	−	−	+
91	4 Med: Simple pneumonia + pleurisy age 0–17	+	−	−
92	4 Med: Interstitial lung disease age >69 and/or C.C.	+	+	+
93	4 Med: Interstitial lung disease age <70 w/o C.C.	+	+	+
94	4 Med: Pneumothorax age >69 and/or C.C.	+	−	−
96	4 Med: Bronchitis + asthma age >69 and/or C.C.	+	+	++
97	4 Med: Bronchitis + asthma age 18–69 w/o C.C.	+	−	+
98	4 Med: Bronchitis + asthma age 0–17	+	−	+
99	4 Med: Respiratory signs + symptoms age >69 and/or C.C.	−	+	−
100	4 Med: Respiratory signs + symptoms age <70 w/o C.C.	−	+	−
104	5 Surg: Cardiac valve procedure with pump + with cardiac cath	−	−	+
105	5 Surg: Cardiac valve procedure with pump + w/o cardiac cath	−	−	+
106	5 Surg: Coronary bypass with cardiac cath	−	−	+
107	5 Surg: Coronary bypass w/o cardiac cath	+	−	+
108	5 Surg: Cardiothor proc. except valve + coronary bypass, with pump	+	+	+

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
109	5 Surg: Cardiothoracic procedures w/o pump	+	+	+
110	5 Surg: Major reconstructive vascular procedures age >69 and/or C.C.	+	–	–
111	5 Surg: Major reconstructive vascular procedures age <70 w/o C.C.	+	–	–
112	5 Surg: Vascular procedures except major reconstruction	++	–	–
113	5 Surg: Amputation for circ system disorders except upper limb + toe	+	–	+
114	5 Surg: Upper limb + toe amputation for circ system disorders	+	–	+
115	5 Surg: Permanent cardiac pacemaker implant with AMI or CHF	++	–	–
121	5 Med: Circulatory disorders with AMI + C.V. comp. disch. alive	++	++	++
122	5 Med: Circulatory disorders with AMI w/o C.V. comp. disch. alive	+	+	+
124	5 Med: Circulatory disorders exc ami. with card cath + complex diag	+	–	–
126	5 Med: Acute + subacute endocarditis	++	+	+
127	5 Med: Heart failure + shock	–	–	+
128	5 Med: Deep vein thrombophlebitis	+	+	+
130	5 Med: Peripheral vascular disorders age >69 and/or C.C.	–	+	+
131	5 Med: Peripheral vascular disorders age <70 w/o C.C.	–	+	+

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
134	5 Med: Hypertension	–	–	+
135	5 Med: Cardiac congenital + valvular disorders age >69 and/or C.C.	+	–	–
136	5 Med: Cardiac congenital + valvular disorders age 18–69 w/o C.C.	+	–	–
137	5 Med: Cardiac congenital + valvular disorders age 0–17	+	+	+
138	5 Med: Cardiac arrhythmia + conduction disorders age >69 and/or C.C.	++	++	+
139	5 Med: Cardiac arrhythmia + conduction disorders age <70 w/o C.C.	+	+	+
140	5 Med: Angina pectoris	+	+	+
141	5 Med: Syncope + collapse age >69 and/or C.C.	–	++	–
142	5 Med: Syncope + collapse age <70 w/o C.C.	–	++	–
143	5 Med: Chest pain	+	++	–
148	6 Surg: Major small + large bowel procedures age >69 and/or C.C.	+	+	++
149	6 Surg: Major small + large bowel procedures age <70 w/o C.C.	–	–	++
152	6 Surg: Minor small + large bowel procedures age >69 and/or C.C.	+	+	+
153	6 Surg: Minor small + large bowel procedures age <70 w/o C.C.	–	–	+
154	6 Surg: Stomach, esophageal + duodenal procedures age >69 and/or C.C.	+	+	++
155	6 Surg: Stomach, esophageal + duodenal procedures age 18–69 w/o C.C.	+	+	+

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
156	6 Surg: Stomach, esophageal + duodenal procedures age 0–17	+	+	++
157	6 Surg: Anal procedures age >69 and/or C.C.	+	–	–
164	6 Surg: Appendectomy with complicated princ. diag age >69 and/or C.C.	–	+	++
165	6 Surg: Appendectomy with complicated princ. diag age <70 w/o C.C.	–	+	+
170	6 Surg: Other digestive system procedures age >69 and/or C.C.	–	+	++
171	6 Surg: Other digestive system procedures age <70 w/o C.C.	–	–	+
172	6 Med: Digestive malignancy age >69 and/or C.C.	+	–	+
173	6 Med: Digestive malignancy age <70 w/o C.C.	+	–	+
174	6 Med: G.I. hemorrhage age >69 and/or C.C.	+	++	+
175	6 Med: G.I. hemorrhage age <70 w/o C.C.	–	++	+
179	6 Med: Inflammatory bowel disease	++	+	+
180	6 Med: G.I. obstruction age >69 and/or C.C.	++	+	++
181	6 Med: G.I. obstruction age <70 w/o C.C.	+	+	++
188	6 Med: Other digestive system diagnoses age >69 and/or C.C.	–	+	+
189	6 Med: Other digestive system diagnoses age 18–69 w/o C.C.	–	+	+
191	7 Surg: Major pancreas, liver + shunt procedures	–	++	++
192	7 Surg: Minor pancreas, liver + shunt procedures	–	+	+

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
193	7 Surg: Biliary tract proc exc total cholecystectomy age >69 and/or C.C.	–	+	+
194	7 Surg: Biliary tract proc exc total cholecystectomy age <70 w/o C.C.	–	+	+
202	7 Med: Cirrhosis + alcoholic hepatitis	–	+	–
204	7 Med: Disorders of pancreas except malignancy	+	++	++
205	7 Med: Disorders of liver exc malig, cirr, alc hepa age >69 and/or C.C.	–	+	–
206	7 Med: Disorders of liver exc malig, cirr, alc hepa age <70 w/o C.C.	–	+	–
207	7 Med: Disorders of the biliary tract age >69 and/or C.C.	+	++	–
208	7 Med: Disorders of the biliary tract age <70 w/o C.C.	–	++	–
209	8 Surg: Major joint procedures	–	–	+
214	8 Surg: Back + neck procedures age >69 and/or C.C.	–	+	–
215	8 Surg: Back + neck procedures age <70 w/o C.C.	–	+	–
218	8 Surg: Lower extrem + humer proc exc hip, foot, femur age >69 and/or C.C.	+	–	–
219	8 Surg: lower extrem + humer proc exc hip, foot, femur age 18–69 w/o C.C.	+	–	–
238	8 Med: Osteomyelitis	+	+	+
242	8 Med: Septic arthritis	+	++	+
243	8 Med: Medical back problems	+	–	–
244	8 Med: Bone diseases + septic arthropathy age >69 and/or C.C.	–	–	+

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
245	8 Med: Bone diseases + septic arthropathy age <70 w/o C.C.	–	–	+
257	9 Surg: Total mastectomy for malignancy age >69 and/or C.C.	+	–	+
258	9 Surg: Total mastectomy for malignancy age <70 w/o C.C.	+	–	+
259	9 Surg: Subtotal mastectomy for malignancy age >69 and/or C.C.	+	–	+
260	9 Surg: Subtotal mastectomy for malignancy age <70	–	–	+
263	9 Surg: Skin grafts for skin ulcer or cellulitis age >69 and/or C.C.	–	–	++
264	9 Surg: Skin grafts for skin ulcer or cellulitis age <70 w/o C.C.	–	–	+
265	9 Surg: Skin grafts except for skin ulcer or cellulitis with C.C.	–	–	+
274	9 Med: Malignant breast disorders age >69 and/or C.C.	+	–	+
275	9 Med: Malignant breast disorders age <70 w/o C.C.	+	–	+
285	10 Surg: Amputations for endocrine, nutritional + metabolic disorders	–	+	++
286	10 Surg: Adrenal + pituitary procedures	–	++	–
287	10 Surg: Skin grafts + wound debridements for endoc, nutrit + metab disorders	–	+	+
288	10 Surg: O.R. procedures for obesity	–	+	–
294	10 Med: Diabetes age =>36	+	–	–
295	10 Med: Diabetes age 0–35	+	–	–

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
296	10 Med: Nutritional + misc. metabolic disorders age >69 and/or C.C.	–	++	–
297	10 Med: Nutritional + misc. metabolic disorders age 18–69 w/o C.C.	–	++	–
298	10 Med: Nutritional + misc. metabolic disorders age 0–17	–	++	–
299	10 Med: Inborn errors of metabolism	–	+	–
300	10 Med: Endocrine disorders age >69 and/or C.C.	–	+	–
302	11 Surg: Kidney transplant	+	++	++
306	11 Surg: Prostatectomy age >69 and/or C.C.	++	–	–
307	11 Surg: Prostatectomy age <70 w/o C.C.	+	–	–
310	11 Surg: Transurethral procedures age >69 and/or C.C.	+	–	–
316	11 Med: Renal failure	+	++	+
320	11 Med: Kidney + urinary tract infections age >69 and/or C.C.	+	+	+
321	11 Med: Kidney + urinary tract infections age 18–69 w/o C.C.	–	+	–
323	11 Med: Urinary stones age >69 and/or C.C.	+	–	+
324	11 Med: Urinary stones age <70 w/o C.C.	+	–	+
325	11 Med: Kidney + urinary tract signs + symptoms age >69 and/or C.C.	–	+	–
326	11 Med: Kidney + urinary tract signs + symptoms age 18–69 w/o C.C.	–	+	–
327	11 Med: Kidney + urinary tract signs + symptoms age 0–17	–	+	–
334	12 Surg: Major male pelvic procedures with C.C.	–	+	–

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
336	12 Surg: Transurethral prostatectomy age >69 and/or C.C.	++	–	–
338	12 Surg: Testes procedures, for malignancy	+	–	–
353	13 Surg: Pelvic evisceration, radical hysterectomy + vulvectomy	+	–	–
368	13 Med: Infections, female reproductive system	++	–	–
378	14 Med: Ectopic pregnancy	–	++	–
383	14 Med: Other antepartum diagnoses with medical complications	–	++	–
385	15: Neonates, died or transferred	–	++	++
386	15: Extreme immaturity, neonate	++	++	++
387	15: Prematurity with major problems	++	++	++
388	15: Prematurity w/o major problems	–	++	–
389	15: Full term neonate with major problems	–	++	++
395	16 Med: Red blood cell disorders age >17	–	++	–
396	16 Med: Red blood cell disorders age 0–17	–	++	–
398	16 Med: Reticuloendothelial + immunity disorders age >69 and/or C.C.	–	++	–
399	16 Med: Reticuloendothelial + immunity disorders age <70 w/o C.C.	–	++	–
400	17 Surg: Lymphoma or leukemia with major O.R. procedure	–	+	–
401	17 Surg: Lymphoma or leukemia with minor O.R. proc age >69 and/or C.C.	–	+	–

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
402	17 Surg: Lymphoma or leukemia with minor O.R. procedure age <70 w/o C.C.	–	+	–
403	17 Med: Lymphoma or leukemia age >69 and/or C.C.	–	+	–
404	17 Med: Lymphoma or leukemia age 18–69 w/o C.C.	–	+	–
405	17 Med: Lymphoma or leukemia age 0–17	–	+	–
406	17 Surg: Myeloprolif disord or poorly diff neoplasm w maj O.R. proc + C.C.	–	+	–
407	17 Surg: Myeloprolif disord or poorly diff neopl with major O.R. proc w/o C.C.	–	+	–
408	17 Surg: Myeloprolif disord or poorly diff neopl with minor O.R. proc	–	+	–
409	17 Med: Radiotherapy	–	+	–
416	18 Med: Septicemia age >17	++	++	++
417	18 Med: Septicemia age 0–17	++	++	++
418	18 Med: Postoperative + post-traumatic infections	+	++	++
419	18 Med: Fever of unknown origin age >69 and/or C.C.	–	++	–
420	18 Med: Fever of unknown origin age 18–69 w/o C.C.	–	++	–
423	18 Med: Other infectious + parasitic diseases diagnoses	–	++	+
434	20: Drug dependence	+	–	–
435	20: Drug use except dependence	+	–	–
436	20: Alcohol dependence	+	–	–
437	20: Alcohol use except dependence	+	–	–
438	20: Alcohol + substance induced organic mental syndrome	+	++	–
439	21 Surg: Skin grafts for injuries	++	–	–

DRG	Name of Group	Is Quality of Care Likely To Be Adversely Affected By: Shorter Stay	Fewer Diagnostic Services	Fewer Therapeutic Services
440	21 Surg: Wound debridements for injuries	+	–	–
444	21 Med: Multiple trauma age >69 and/or C.C.	+	++	++
445	21 Med: Multiple trauma age 18–69 w/o C.C.	+	+	+
446	21 Med: Multiple trauma age 0–17	+	+	+
449	21 Med: Toxic effects of drugs age >69 and/or C.C.	+	–	–
456	22: Burns, transferred to another acute care facility	++	+	+
457	22: Extensive burns	++	+	+
458	22 Surg: Non-extensive burns with skin grafts	++	–	–
459	22 Surg: Non-extensive burns with wound debridement + other O.R. proc	++	–	–
462	23 Med: Rehabilitation	+	+	++

NOTE: See introductory text for explanation of abbreviations and symptoms.

Appendix B

DATA SOURCES

Several sources of data could serve this research agenda. Generically, they are (a) administrative data automatically flowing to HCFA via the Medicare Statistical System), (b) data from hospital discharge abstracts, (c) data obtained from primary data collection through HCFA grants, contracts, or cooperative agreements, and (d) "case report," anecdotal, or survey information that might be acquired from a variety of sources. This appendix comments briefly on some aspects of these information sources.

MEDICARE STATISTICAL FILES

The most important source of administrative data is the Medicare Part A Hospital Stay Record File.[1] As of FY84, this is a file on 100 percent of Medicare admissions containing up to five diagnoses (if needed), up to three procedures (if performed), and the DRG assigned. Diagnoses and surgical procedures are coded with ICD-9-CM codes.[2] Other data include patient demographic information and beneficiary identification number, provider (hospital) identification, dates of admission and discharge, patient status and destination at discharge, and total charges for various categories of services (e.g., pathology, physical therapy).

Timeliness and completeness of this source is an issue for initial evaluations of PPS. Three problems arise. First are the usual data processing delays; furthermore, more complex cases take longer to enter the data base. Second, timing of PPS is staggered; nearly one-half of hospital stays were not PPS stays until three-quarters of the way through the first fiscal year. Finally, known or expected improvements in coding diagnostic and procedure information about admissions may obscure real changes in provision of services.

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[1]This 100 percent file is sometimes referred to as the PATBILL file. Previously, only a 20-percent sample of hospital stays had such diagnostic and procedure information (the "MEDPAR" file); it was then based on "narrative" descriptions and generally was thought not to reflect accurately the volume or type of procedures.

[2]ICD-9-CM is the International Classification of Diseases, ninth edition, clinical modifications. It forms the current coding basis for DRGs.

At the outset, less attention would be given to Medicare Part B (Supplementary Medical Insurance) data for two reasons. First, initial PPS evaluation cannot be based solely on this source, because it covers only physician services, home health service visits, outpatient hospital services, and other medical services and supplies. Second, specific information about procedures, etc., is available only when the files are obtained directly from the Medicare carriers; i.e., "administrative" Part B data arriving at HCFA would probably be insufficient for quality-of-care research. The HCFA version of Part B data may be expanded to include actual procedure and service codes (rather than aggregate charges), which would contribute greatly to developing a more complete picture of the care delivered to the elderly, but this may be done on only a small sample of beneficiaries.

Improving the Part B Payment Record would facilitate studying the inpatient vs. outpatient distribution of procedures, investigating possible changes in ancillary services, and evaluating care rendered for entire episodes of illness. Linking the Parts A and B data bases adds diagnoses and DRGs to the picture of outpatient care. HCFA is undertaking to develop such a file (MADRS) on a sample basis, but using these data for research lies well in the future.

OTHER SOURCES OF HOSPITAL DATA

Discharge abstracts provide another possible resource. The two most prominent sources of such information are the National Hospital Discharge Survey (NHDS) and the Commission on Professional and Hospital Activities (CPHA). The former is carried out on a stratified sample of facilities and patient records within facilities; data are taken from the hospital record face sheet and include many of the same items as the current Part A Medicare file (but not patient identifiers or complete diagnostic or procedure information).

The CPHA is a voluntary operation in which about 1500 participating hospitals provide a set of data in return for various interinstitutional analyses and internal cost studies. Data elements parallel those of Part A Medicare (and NHDS) except (mainly) for procedures and secondary diagnoses; a sample of about 250 to 300 hospitals provides information on costs and diagnostic tests. Reporting hospitals are considered nationally representative, but data are confidential and cannot be linked to individual facilities.

Both of these sources include information on patients other than Medicare beneficiaries, are drawn from a subset of inpatient facilities, and would not permit linking of records across patients or hospitals. Data have been collected over long stretches of time, however.

PRIMARY DATA COLLECTION

Primary data collected by HCFA contractors and grantees almost by definition does not lend itself to a priori description. We alluded just above to the fact that work that attempts to combine Parts A and B data may require "primary data acquisition" through the Part B carriers, depending on the completeness of the joint Part A and B file now under development. This might be especially true for longitudinal investigations covering the pre-PPS era or research concerned with changes in diagnosis and procedure coding.

Probably the most important primary data collection will involve medical record abstraction as a means of directly assessing patient care under PPS. Medical record study of this sort principally addresses the longer-run questions of (a) whether and how PPS may have influenced the practice of medicine and affected critical standards of the process of care and (b) whether such changes, if any, have in turn affected the outcomes of care in the hospital. It will be important to involve a broad representation of the medical profession in the conceptualization, design, and implementation of such a study to ensure that it is perceived as fair and valid. To be as effective and efficient as possible, it should also be carefully focused on areas in which the most critical threats to quality of care are believed to exist.

Among the first steps to design a medical-record-based project will be to narrow the range of individual diagnoses or procedures, types of patients, and types of hospitals studied to a manageable number. Criteria for selecting conditions could include those noted in the discussion of Tables 7 and 8. Topic selection must also take into account of whether objective, clinically acceptable outcome criteria exist.

Finally, samples of hospitals must be carefully specified. Attention might be given, for example, to hospitals that appear to be managing successfully in the PPS environment but may be delivering poor care (by underproviding needed services) and/or to hospitals that appear to be delivering adequate care but are nonetheless facing serious financial problems that might threaten closure.

ANECDOTAL DATA

"Case study" or "anecdotal" information might also be obtained through existing HCFA contracts or grants. State or local governments might be asked to alert HCFA about patterns of adverse effects occurring within their jurisdictions. Moreover, other federal agencies (e.g., the General Accounting Office, the Office of Technology Assessment, and the National Center for Health Services Research) are likely

to mount investigations relating to PPS and quality of care, and contact should thus be maintained with these sources. Physician organizations such as the American College of Physicians or various specialty societies will be a rich source of information and perhaps "early warning" of problems, as physicians in private practice are showing an increasing tendency to report problematic cases to such professional associations. Likewise, professional associations of other providers, including nurses, social workers, and other therapists, should be equally productive sources of information and subjective assessments.

The American Medical Association (AMA), for instance, has established a DRG Monitoring Project to provide the AMA House of Delegates with a broad, albeit short-term assessment of problems and concerns with DRG implementation. Its first report (through October 31, 1984), based on questionnaire responses representing about 6500 physicians in 38 states, numerous medical specialties, and various types of hospitals, indicated both positive and negative effects of DRG-based PPS. Problems were considered particularly possible for bilateral knee and hip replacement, intraocular lens implants, leukemia, burns, spinal injury, respiratory failure, subacute bacterial endocarditis, and complicated cases generally. Potential difficulties were also forecast for small or rural hospitals and for patients on various research protocols (e.g., for treatment of cancer according to NIH-approved regimens).

The Council of Medical Specialty Societies has also pilot tested a survey of its members on the effects of DRGs on quality of care. Preliminary results from the pilot, reported at a November 1984, meeting of the CMSS DRG Advisory Group, included the intriguing information that physicians who had had greater experience with DRGs (by virtue of more frequent Medicare admissions to hospitals that had been on PPS longer) perceived that PPS did reduce quality, in some instances significantly. This contrasted with the views of physicians having little experience, who indicated that the new payment system had not had much effect on quality of care. The full study will be carried out, under the aegis of the various specialty societies, in FY85.

Clearly, these examples go well beyond "anecdotal" reporting. The point is, however, that HCFA can and should avail itself of the timely and clinically relevant information produced by these efforts, using such data to complement and extend its more formal research agenda.

HSQB AND PRO DATA

We alluded in Sec. IV to the potential utility of PRO data available through the Health Standards and Quality Bureau, HCFA. Such information might include cataloguing quality problems cited by PROs as objectives in their contract submissions.[3] These topics (or at least the way they are addressed) tend to be state-specific, but some quality objectives will be similar across several jurisdictions. The main limitations at present to this approach is that first two-year-period objectives are drawn mainly on pre-PPS-era data; there is widespread belief that different quality-related concerns may surface as PPS begins to take hold.

The many mandated review tasks other than the five quality objectives may uncover quality concerns that could not be identified a priori. Altogether, PROs may review as many as 50 percent of the medical records of Medicare admissions in the course of a year's required activities—producing a virtually unparalleled entree to information pertaining to quality of care. Exactly how such information might be collected and aggregated across PROs and used for quality-of-care research remains an open question, especially in the absence of a standardized data collection instrument and training program used by all PROs.

The PRO medical review system is designed to detect and correct inappropriate utilization and provider errors. It can generate several types of data:

1. quarterly statistical progress reports on PRO review activities and impacts;
2. detailed reports about patterns of unnecessary or inappropriate care; and
3. internal management data describing the review of each case.

The last category of data is not generally available to HCFA, but it could possibly be used in studies performed by the PROs or other contractors. In addition, the PROs compile and periodically submit to HCFA data through PHDDS (PRO Hospital Discharge Data Set). These data are similar to, but quite independent of, Part A data; they include information about PRO review activities and the admissions but exclude patient's name and physicians' names from the data set submitted to HCFA.

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[3]The first step in this was accomplished in September 1984, when HSQB staff compiled a summary of the quality objectives of the first 31 PRO contracts signed. The remaining 23 contracts were to be included in a second volume.

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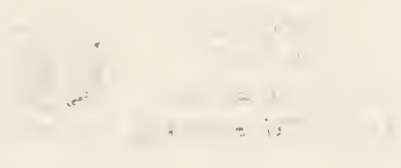

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